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ERRATA.

In article on "Dry Ore Concentration at the Manhattan Silver Mill," in the table at foot of page 65, in columns headed "Wood Consumed," "Charcoal Consumed," "Pan Charges," instead of "$" read "cords," "bushels," "pounds," respectively.

PROFITS OF BRITISH MINES.

Our English exchanges give, as a proof of the profitableness of mining investments, a list of 37 British mining companies that have returned in profits £9,100,000, or, say, $45,000,000. This is but little more than the amount of dividends declared by one mine on the Comstock.

THE LABOR WAR.

The strike still continues in the Wyoming region. Miners, led by Molly Maguires and other violent characters, still threaten such of their companions as are desirous of working. The companies having plenty of coal on hand are benefited rather than injured by the temporary stoppage of their mines, since their coal brings them higher prices than formerly. With the resumption of work the price, which is now about 50 cents per ton above the lowest quotations of a few weeks ago, will probably fall back again, but it is unlikely that they will reach the lowest figures recently ruling. It is to be hoped better counsels will soon prevail with the miners, and that they will return to work. If they could secure steady employment, even the present low wages would make their earnings at least as high as can be obtained in other employments requiring equal skill, and there is nothing in the present condition of business to justify an advance in wages. A sliding scale of wages is probably the fairest arrangement that can be made, for in it the men participate in any advance in the market price of coal, and no doubt it is in great measure owing to this that the Schuylkill men have refused to join the Wyoming men in their strike.

THE SOLUTION OF A GREAT PROBLEM AT THE NEW HAMPSHIRE COPPER MINES.

The copper mines near Littleton, N. H., are said to be developing fairly, so well, indeed, that a "Special" of the Boston *Globe* recently saw fit to pay them a visit and to give them a puff.

Not satisfied with the usual indefinite puff, which praises generally without items, this inexperienced penny-a-liner makes some announcements that are somewhat startling to the expert. *Of course*, he finds the ore *invariably* becomes richer as depth is attained; and now, at last, we have some definite, positive knowledge as to the rate of this increase in richness. Citing a number of mines, the *Globe* expert gives the assay value of the ore at the bottoms of various shafts as much greater than near the surface; but though these cases are all interesting and valuable, yet only one of them seems to solve definitely the great problem. This is "The Quint Mine," which has attained the depth of 65 feet. The ore at the surface is iron pyrites, "white" and presumably free from copper, while at the bottom of the shaft the ore is deep yellow copper pyrites, containing 40 per cent. of copper! As pure chalcopyrite (copper pyrites) contains but 34·6 per cent. of copper, it is evident that this remarkable deposit has passed the critical stage and is changing into ingot! This fact, vouched for by the *Globe* "Special," is in itself very remarkable, but its interest is still further increased by the data which enable us to calculate the rate of increase in richness. The calculation is exceedingly simple and quite within the ability of even the directors of a coal company. If the copper has increased from 0 per cent. at 1 foot deep (the surface) to 40 per cent. at 65 feet, it increases just 0·615 of one per cent. for every foot gained in depth; and at 137½ feet the bed would be chemically pure metallic copper—better than ingot. *Q. E. D.* The Yanks are bound to be ahead.

A SCIENTIFIC EXPEDITION AROUND THE WORLD.

In our advertising columns will be found the announcement of the Woodruff Scientific Expedition Around the World. The novelty and interest attaching to the project merit and will receive the attention of a large number of our readers. The expedition will occupy two years, and during that time will visit among other countries several of the South American States, West Indies, the Pacific Islands, Australia, Japan, China, Madagascar, Borneo, India, Egypt, Palestine, Greece, Italy, France, Spain, and Great Britain. The time occupied will afford opportunity to become acquainted with many of the notable features of each country, and these cannot fail to make a permanent impression upon the minds of those so eager for knowledge.

We can scarcely imagine a more agreeable and instructive manner of passing two years, and we have no doubt the opportunity will be embraced by all who can afford the time and expense. Considering the advantages offered, this last item, $2,500 for the two years' expedition, must be considered as very reasonable.

The prospectus, to which our attention has been called, contains the names of a full corps of professors. Many of these gentlemen are quite well and favorably known, and their names certainly carry the conviction that the expedition will not be merely a pleasure excursion—though it will undoubtedly be that—but rather an effective and comprehensive course of study, carried on under new and favorable conditions. The expedition will, it is expected, contain about 400 students, some of whom will be ladies, and the steamship engaged for the cruise (the *Ontario*, 3,500 tons) will give ample accommodation to this number. The course of study will be mostly the different branches of natural history, geology, paleontology, history, and geography. This experiment will be watched with much interest throughout the civilized world, for with proper discipline it seems to us it should be very successful, and the precursor of many others. Though the expenses of the expedition are put at $2,500, and there are no extras, yet there will be so many inducements to spend money in special excursions that the expenditures in reality will be somewhat greater than this figure, but may still be considered as very moderate.

Strict discipline and tact in those commanding the expedition will be in the highest degree necessary—indeed, on the presence or absence of these depends the success or failure of the whole enterprise. Those in charge are said, by those personally acquainted with them, to possess in a high degree these rare and desirable qualities.

The sum ($30,000) appropriated to defray the expense of inland excursions—a number of which are projected—seems to us to be totally inadequate. In fact it amounts to only $75 for each person, and it requires little experience to appreciate the insufficiency of this to make even a small portion of the trips announced. $100,000 would, it seems to us, be much nearer the sum required, and even that might easily be exceeded.

A SUMMER SCHOOL OF PRACTICAL MINING.

Such a school, for the instruction of the student in the details of miner's work, has recently been added to the curriculum of the School of Mines of Columbia College. This summer school has been put in the charge of HENRY S. MUNROE, a former graduate of the School, who was recently elected by the trustees to the position of Adjunct Professor.

It is proposed that the students of the school shall visit mines in different parts of the country worked for coal, iron, copper, lead, precious metals, etc., and spend a month or six weeks at each, making a careful and detailed study of the mine, and actually engaging, under the instruction of skilled miners, in all the details of mine work.

On the invitation of Mr. ECKLEY B. COXE, the first experiment was made this summer at the mines of COXE BROS. & Co., Drifton, Pa., and with very remarkable success. A dozen students, volunteers from the class of '78, have just left Drifton, after a stay of five weeks. These students, on reporting to Professor MUNROE, were divided into squads of two or three men each, and on Monday, July 2, were assigned to the care of skilled miners, selected for the purpose by the mine boss, for instruction in gangway work. Half of the students worked in the morning and the other half in the afternoon, one squad at a time with each

miner. The times of going and coming to and from work were so arranged that each student spent four to four and a half hours in the mine each day.

On coming out of the mine each squad was required to make a written report of the work done, with sketches showing the location, direction, depth, etc., of each shot fired, and the effect produced.

While in the mine they assisted the miner to load his car, thereby learning readily to distinguish "slate" and "bony" from good coal, even in the uncertain light afforded by their mine lamps.

They were also instructed in the use of the drill and pick, boring themselves the blast holes, judging the quantity of powder required, making up the cartridge, tamping, and firing the shot.

Four days were thus spent in the gangways learning the rudiments of miners work, and then the students were transferred to the charge of other miners selected by the mine boss, working in breasts of different degrees of pitch, spending one or two days with each.

From this time on less importance was attached to manual labor on the part of the students as a necessary part of the scheme of instruction, though most of the students of their own choice still continued to work more or less. The principal advantage gained by this manual work was the breaking of the ice between the student and the miner, placing them in pleasant relations and on common ground, the student for the time becoming, to all intents and purposes, the miner's "butty," and to be treated and instructed as such.

Another advantage gained was the knowledge of the different conditions having influence on the ease or difficulty of working, and thus some idea of value of that most variable quantity—a day's work.

In addition to their work in gangways and breasts, the students also spent some days with other skilled miners in setting props and timbering gangways, building brattice and driving airway, laying tracks and putting in switches on mine roads, in getting coal by robbing, in artesian well boring for water, boring by hand for exploration, etc. etc. After the students had spent in this way about twenty days at different kinds of work underground and in the "breaker," subjects for more detailed study and investigation were assigned them. Each student, having chosen his theme, spent the remainder of his time in collecting material for a memoir. "Underground Haulage," "Ventilation," "Mine Pumps," "Hoisting Engines," "Winning of Coal in Breasts of different degrees of pitch," "Artesian Well Boring," "Breaking and Sizing of Anthracite," "Separation of Slate from Anthracite," "Water Supply for Boilers, Household Use, and Washing of Coal," etc. etc., were among the subjects thus assigned. During the last few days trips were made to several mines in the vicinity, at Hazelton, Ebervale, etc., spending a day underground in each case with the mine bosses, who explained in detail the characteristics of their mine and their methods of working. MR. COXE, also, during their stay, gave the students several informal talks of great practical value on the mining of anthracite, installation of machinery, management of men necessity for scientific bookkeeping, discussion and analysis of mine accounts, etc. etc.

The miners and the mine bosses of the Cross Creek collieries have taken great interest in the experiment, and to their cordial and hearty co-operation in the carrying out of all the details of the plan is due in no small degree the very gratifying success attained.

It is, however, to the interest taken by Mr. ECKLEY B. COXE in this new departure in mining education that its success is in a large measure due, for he not only encouraged the idea when proposed, but placed his collieries—probably the finest in this country—at the service of the school, and gave such instructions as secured for the students a favorable introduction to the miners.

One of the most notable and prominent features of this effort to introduce the practical element into the studies of the school of mines has been the demonstration that the students are not "a nuisance" about the works, but, on the contrary, are welcomed by the miners, and are found to make no trouble or interference with the work of the colliery. This is so fully demonstrated that in future owners of mining works will, no doubt, be willing and glad to help the good cause by offering facilities at their respective works for courses of study similar to this.

We congratulate the School of Mines upon the fortunate selection of Professor MUNROE, for the important position which he holds. The success of this preliminary campaign is evidence of those qualities of good judgment and tact, which, added to his recognized professional ability, presage the most flattering results from his instruction. This experiment met with the warm approval of, and was watched with great interest by Prof. TROWBRIDGE, who is the Professor of Engineering at the School of Mines, and in whose department this course consequently comes.

COAL AFFAIRS IN COLORADO.

Staff Correspondence of the Engineering and Mining Journal.

The coal strike in Colorado expired some time ago very suddenly and very quietly. There was concession on both sides, and some rather fine play between opposing collieries. In a certain sense the men gained their point, and in another they lost, for one mine imported a gang of Eastern miners and are keeping them still, while the strikers are now regarded by all the other collieries as uncertain, and, though finding it better and more convenient to employ them for the present, will never have the same regard for and interest in them as before.

The Colorado coal mines are more developed, and show a higher degree of productiveness, than those of any other Western State or Territory, California alone excepted. The reason for this is not because the quality of the mineral is any better than the lignites of Utah, Nevada, Montana, Oregon, or Washington, but because the State in point of development is considerably in advance of its sister communities. The railroad consumption fully equals that of California, and the demand for domestic and manufacturing purposes is unusually large for the population, and increases steadily. Coupling with these facts the great accessibility of its best lignite deposits, four of which are tapped by rail lines, it is not difficult to understand why the State is abundantly and cheaply supplied with fuel.

The lignite fields of Colorado constitute one of the most interesting geological studies in the West. As mine after mine has been opened it has become apparent that the deposits are very extensive, and of a rather superior quality in many cases. There are three distinct varieties found, viz. the ordinary lignite of the northern part of the State, the semi-bituminous or gas coals of Cañon City and Trinidad, and the so-called semi-anthracites of the Gunnison and Lower Bear River. The first two are being energetically worked with excellent results, while the latter are almost unexplored, being located on the west side of the mountains where there is no demand whatever as yet for mineral fuel, and no incentive to its development. Specimens of this semi-anthracite coal show it to be different from lignite, and indicate that it has been subjected to much heat and pressure.

The various working collieries in the State are now yielding together about 8,500 tons of coal per month, which sells at the pit's mouth at $2 to $3 per ton, and by retail in the Denver market $4.50 to $6 according as it is Erie or lignite coal, or cañon, which, as before stated, is semi-bituminous. None of the lignites are sold south of Denver, except along the line of the Kansas Pacific and Atchison, Topeka & Kansas City, because the Rio Grande Railroad running south from the capital is the proprietor of the Cañon City mines and forces its own coal on all the southern towns. The Cañon and Trinidad varieties are, however, sold to a limited extent in the northern part of the State, the former principally for furnace use, and the latter for the manufacture of gas, in both of which uses the Erie lignite is not found to be so good. The southern coals of Colorado are found to be an excellent fuel for reverberatories, producing a long flame and a great heat, and there is no doubt that in a few years they will be in common use in the smelting works of the State, either alone or mixed with a proportion of Erie lignite. The Trinidad coal produces an excellent coke and a good quality of illuminating gas. At these mines there are a large number of coking ovens in operation, and samples of the product have been treated in the State and in the blast furnaces of Utah with gratifying success.

The Rob Roy Mine, a description of which (illustrated) appeared in a recent issue of the JOURNAL, is the representative coal mine of Northern Colorado, and has become already a property of great value. Located at Erie, on the line of the Boulder Valley Railroad, it is in direct rail communication with every city and town in the northern part of the State, and also with Cheyenne. The mine, as was shown by the handsome drawing which was published in the JOURNAL, is supplied with convenient hoisting, pumping, and screening works, a fine boarding house and laundry for the men, and a substantial dwelling house for the Superintendent. The coal is of No. 1 quality, hard, bright, and remarkably free from slate, and for a lignite weathers well. The company owning it supplies the largest part of the northern trade, and is vigorously pushing its productions into the mountains wherever the railroad reaches.

There is an inviting and promising outlook in Colorado for coal investments, and the field is continually growing in view of the extension of the railroad system of the State and the increased demands for smelting purposes. We should be glad to see the attention of capitalists drawn to this subject. Coal mining in the far West is yet in its infancy, and has an immense future before it. The topography of the Rocky Mountain Territories is such that the coals inside the range can never be produced in competition with those outside, and in addition the lignites at the base of the mountains are found to be so superior to those mined from the limited beds of Eastern Kansas and Nebraska, that it is only a matter of a few years before Colorado coal will be found as far East as Kansas City and Omaha and at every town in the vast plains between the Missouri and the mountains.

THE ACTION OF SMALL SPHERES OF SOLIDS IN ASCENDING CURRENTS OF FLUIDS, AND IN FLUIDS AT REST.*

By J. C. Bartlett, A. M., Cambridge, Mass.

The following discussion was suggested by an experiment of Mr. Krom, the manufacturer of air-jigs, to illustrate the superiority of air over water as a medium of concentration. The paper is written in the interest of no system of concentration, but simply to test the experiment, and, perchance, to add something to the general fund of information on the subject.

To speak of testing an experiment by a theoretical discussion, may seem a misuse of terms, but the theories concerning falling bodies and the resistance of fluids are pretty well crystallized into laws, which may properly be used to show where experiments which seem to refute them were improperly performed, and that instead of refuting they only corroborate.

* A paper read before the American Institute of Mining Engineers, at the Wilkes-Barre meeting, May, 1877.

It is well known that a sphere of galena ⅛ inch in diameter, and a sphere of quartz ½ inch in diameter, are equal-falling in water; that is, these two spheres, being placed together in a column of water at rest or in motion, will practically remain together, falling or rising together, or remaining in suspension. Mr. Krom, to show that these spheres could be separated in a current of air, and hence, as he supposes, to show that air is a better medium for separation than water performed the following experiment. He says: "I erected two glass tubes, each 2 inches in diameter and 8 feet high. One of these tubes I filled with water, through the other I forced a regulated blast of air. I found that, practically, as above stated, ⅛ inch globule of galena, and 4-8 inch globule of quartz fall in equal times in the column of water. But when the blast of air was regulated to retard the galena in falling to the same extent as water, then the 4-8 of quartz was sustained by the blast of air and did not fall, while the galena fell as rapidly as in the tube of water."

It is a very remarkable coincidence that the quartz ball should be exactly held in suspension, and the galena ball should be caused to fall in exactly the same time as in water by the same blast of air. It might be supposed that the quartz ball, the two balls being transferred from water to air, losing so much more sustaining force due to the buoyancy of the water than the galena, would tend to fall faster than the galena ball, and hence that a blast of air which held the former in suspension would cause the latter to rise. On the other hand, the sustaining force due to the velocity of the air would be much greater in the case of the quartz than the galena, so that a blast of air which would hold the former in suspension might allow the latter to fall. What the actual result would be can only be determined by a consideration of all the conditions together, and will appear from the following investigation.

In Rittinger's treatise on *Ore Dressing* the following formulæ are deduced for spherical solids in a rising stream of water. They are equally true for any other fluid, if we make the proper change in A and B for difference of density:

$$(1)\quad v = \frac{A^2C^2 - 1}{A\left\{\frac{\varepsilon^{2Bt}+1}{\varepsilon^{2Bt}-1} + AC\right\}}$$

$$(2)\quad s = \frac{AC+1}{A}t - \frac{1}{AB}\log\frac{(AC+1)\varepsilon^{2Bt} - (AC-1)}{2}$$

In (2) the logarithm is the Napierian; C is the velocity of the ascending current of fluid, v the velocity of the sphere at the end of t seconds, s the distance upwards passed over by the sphere in t seconds,

$$A = \sqrt{\frac{3a\,\Delta}{2d\,\gamma(\delta-\Delta)}}, \qquad B = \frac{g(\delta-\Delta)}{\delta}A.$$

In these values of A and B, $a = 25{\cdot}5$, a constant determined by theory, and verified by experiment, being the force in kilograms exerted on a surface one meter square by water flowing directly against it with the velocity of one meter per second; Δ is the density of the fluid, δ the density of the sphere, γ is 1,000, the weight in kilograms of one cubic meter of water; g is the acceleration due to gravity, or 9·809 meters; d is the diameter of the sphere in meters, and ε is the Napierian base, or 2·71828. The reproduction of these formulæ is somewhat lengthy, though not difficult, and will therefore not be given here. The reader who wishes to satisfy himself as to their correctness is referred to the above-mentioned work. From them simpler formulæ for special cases will be deduced. The contraction log. indicates the Napierian logarithm.

If in (1) C = 0, or the fluid is at rest, we obtain

$$(3)\quad v = -\frac{1}{A}\cdot\frac{\varepsilon^{2Bt}-1}{\varepsilon^{2Bt}+1},$$

and if 1 is very small compared with ε^{2Bt}, we obtain from this

$$(4)\quad v = -\frac{1}{A}.$$

If in (1) 1 may be neglected in comparison with ε^{2Bt}, we obtain

$$(5)\quad v = C - \frac{1}{A}.$$

If in (1) $v = 0$, or the sphere is held in suspension in the fluid, we have

$$(6)\quad C = \frac{1}{A}.$$

If C is greater than $\frac{1}{A}$, v is positive, and the sphere rises. If C is less than $\frac{1}{A}$, v is negative, and the sphere falls. If in (2) C = 0, we obtain

$$(7)\quad s = -\frac{1}{AB}\log\frac{\varepsilon^{Bt}+\varepsilon^{-Bt}}{2}.$$

If we solve this for t, we get

$$(8)\quad t = \frac{\log\left(\varepsilon^{-sAB} + \sqrt{\varepsilon^{-2sAB}-1}\right)}{B}$$

If in (8) 1 may be negatived in comparison with ε^{-2sAB}, which is generally the case in practice, s being negative when C = 0, we obtain

$$(9)\quad t = \frac{\log.\ 2}{B} - sA.$$

If in (2) we neglect AC —1, which is generally small compared with $(AC+1)\,\varepsilon^{2Bt}$, and solve for t, we get

$$(10)\quad t = \frac{\log.\left[\frac{AC+1}{2}\right] + sAB}{B(AC-1)}$$

and if in (10) C = 0, it reduces to (9). By approximations (2) may be reduced to

$$(11)\quad s = \left[C - \frac{1}{A}\right]t,$$

or, for those cases where the velocity of the sphere may be regarded as constant, we may write $s = vt$, and take the value of v from (5), thus obtaining (11).

For small spheres falling or rising in water, all the approximate formulæ are accurate enough, but not always so when the fluid is air, and they must be used with caution. In the consideration of particular cases, we shall see to what extent the approximate formulæ are trustworthy. For the sake of clearness and brevity, the discussion is put in the form of problem and answer, all the work of computation being omitted. In the following cases the densities of water, air, quartz, and galena are taken as 1, 0·00125, 2·6, and 7·5 respectively.

I. What must be the velocity of an ascending current of air to keep in suspension a quartz ball ½ inch in diameter? From (6) we find C = 86·2 feet per second.

II. What will be the action of a galena ball ⅛ inch in diameter in an ascending current of air having a velocity of 86·2 feet per second? For the galena ball the value of $\frac{1}{A}$ is 73·21; hence C is greater than $\frac{1}{A}$ and the galena will rise with an increasing velocity, the limit of which is $C - \frac{1}{A}$ or 13 feet per second.

III. In what time will a ball of galena ⅛ inch in diameter fall 8 feet in water at rest? From (11) we get $t = 3{\cdot}32$, and from the more exact formula (9) $t = 3{\cdot}38$. As in this case $-2sAB = 76{\cdot}8$, we see that 1 may be omitted under the radical sign in (8), and (9) may be used without appreciable error. By applying (9) to the case of a quartz ball ½ inch in diameter falling with the galena, we find $t = 3{\cdot}43$, a difference of 0·05 second. A part of this difference is due to the fact that the two balls are not exactly equal-falling theoretically, the ratio of the diameters of equal-falling spheres of quartz and galena being 4·0625 : 1, and not 4 : 1, as assumed. If we substitute the ratio 4·0625 : 1, we get $t = 3{\cdot}40$ instead of 3·43. The rest of the slight difference is easily accounted for by explaining the meaning of equal-falling bodies. Two equal-falling bodies are not necessarily two bodies which fall from rest through the same distance in the same time; but they are two bodies such that the limit of the velocity which they acquire by falling from rest in any fluid is the same for both. This limit of velocity is found by making t infinite in (1), and is $C - \frac{1}{A}$ or $-\frac{1}{A}$ if C = 0. To illustrate this point with another example, it may be asked:

IV. What will be the velocity of an ascending current of water to keep in suspension a ⅛ inch galena ball, and what will be the action of a ½ inch quartz ball in this stream of water? From (6) we find that the velocity is 2·41 feet per second, and from (5) we find that the quartz ball would rise, its maximum velocity being 0·0187 foot per second. Practically, of course, they would remain together. If we reverse the problem, asking the velocity necessary to keep the quartz ball in suspension, we find 2·39 feet per second, and that the galena will fall with a maximum velocity of 0·0187 foot per second.

V. What will be the velocity of an ascending current of air to keep a ⅛ inch galena ball in suspension, and what will be the action of a ½ inch quartz ball in this current? By (6) we get as before 73·21 feet, and if we substitute this value in the exact formula (1) with the proper value of A, we find:

When $t = \frac{1}{8}$ $v = -3{\cdot}83$.
When $t = 1$ $v = -6{\cdot}57$.
When $t = 2$ $v = -9{\cdot}82$.
When $t = 4$ $v = -12{\cdot}28$.

The limit which v continually approaches, and practically reaches after a few seconds, is —12·98. This illustrates how soon, even in air, the velocity of small spheres becomes practically constant.

VI. What will be the diameter of a galena ball which will be held in suspension by an ascending current of air which will sustain a quartz ball ½ inch in diameter, that is, having a velocity of 86·2 feet per second? Solving (6) for d, which is contained in A, we get $d = 1{\cdot}386$ eighths of an inch.

VII. What is the diameter of a galena ball which, in an ascending current of air which keeps a quartz ball ½ inch in diameter in suspension, will fall with the same velocity as in water at rest? If we assume that the velocity has become practically constant, we may employ (5) to solve the problem. For the galena falling in water at rest we have, $v = -\frac{1}{A}$, which may be written $-\frac{1}{A_w}$, the subscript w denoting that A is taken with reference to water. In the same way we shall have A_a for A taken with reference to air. Hence (5) will become $-\frac{1}{A_w} = C - \frac{1}{A_a}$ or $\frac{1}{A_a} - \frac{1}{A_w} = C$. Solving this for d, which is contained in A_a and A_w, we get $d = 1{\cdot}48$ eighths of an inch.

VIII. What is the diameter of a galena ball which, in an ascending current of air which keeps a ½ inch quartz ball in suspension, will fall from rest through 8 feet in the same time it would fall 8 feet in water at rest? Formula (2) is the one to apply to this question, A and B being functions of the required diameter, and s, C, and t being given: $s = 8$ feet, C = 86·2 feet, $t = 3{\cdot}38$ seconds. In this case AC—1 may be neglected, and we may employ (10). Though we cannot solve this last question directly for d, we may find the value of d by approximations, starting with the value obtained in the preceding question.

Solving for s, we have

$$(12)\quad s = \left[C - \frac{1}{A}\right]t - \frac{1}{AB}\log.\left[\frac{AC+1}{2}\right]$$

In this the value d, 1·52 eighths of an inch, gives $s = 7{\cdot}996$, instead of 8 feet as given in the data. This answer, 1·52 eighths inch, is practically the same as that found in the preceding question, 1·48 eighths inch. The difference between the two questions should be noticed, and the reason why d should have a little larger value in the latter will be understood upon a moment's reflection.

IX. What will be the velocity of an ascending current of air in order that in it a ⅛ inch galena ball shall fall 8 feet in the same time as in water at rest? Taking formula (12) and substituting the known values of A, B, t, and s, we find C = 69·62 feet.

X. In what time will a ½ inch quartz ball fall 8 feet in an ascending current of air, having a velocity of 69·62 feet per second? From (10) we obtain $t = 0{\cdot}9209$, or nearly one second.

XI. Compare the velocities of spheres of galena and quartz falling in an ascending current of air having a velocity of 20 meters per second, the spheres being equal-falling in water, the galena having a diameter of 4 mm., and the quartz 16¼ mm. From (1) we find:

For $t = 1$	$v = -2{\cdot}606$ m. for galena.	$v = -4{\cdot}263$ m. for quartz.
For $t = 2$	$v = -3{\cdot}901$ m. "	$v = -6{\cdot}761$ m. "
For $t = 4$	$v = -4{\cdot}801$ m. "	$v = -8{\cdot}899$ m. "

The limit of the velocity of the galena is — 5·045, and for the quartz — 9·714.

TO BE CONTINUED.

THE VALLEY OF THE COLORADO RIVER, AND ITS GEOLOGY.—II.*

The topographic features of the Valley of the Colorado, or the area drained by the Colorado River and its tributaries, are, in many respects, unique, as some of these features, perhaps, are not reproduced, except to a very limited extent, on any other portion of the surface of the globe. Mountains, hills, plateaus, plains, and valleys are here found, as elsewhere throughout the earth; but, in addition to these topographic elements in the scenic features of the region, we find buttes, outlying masses of stratified rocks, often of great altitude, not as dome-shaped or conical mounds, but usually having angular outlines; their sides are vertical walls, terraced or buttressed, and broken by deep, re-entering angles, and often naked of soil and vegetation.

Then we find lines of cliffs, abrupt escarpments of rock, of great length and great height, revealing the cut edges of strata swept away from the lower side. Thirdly, we find cañons, narrow gorges, scores or hundreds of miles in length, and hundreds or thousands of feet in depth, with walls of precipitous rocks.

In the arid region of the Western portion of the United States, there are certain tracts of country which have received the name of Mauvaises Terres or Bad Lands. These are dreary wastes—naked hills, with rounded or conical forms, composed of sand, sandy clays, or fine fragments of shaly rocks, with steep slopes, and, yielding to the pressure of the foot, they are climbed only by the greatest toil and it is a labor of no inconsiderable magnitude to penetrate or cross such a district of country. The steep hills are crowded together, and the waterways separating them are deep arroyas. Where the mud rocks or sandy clays and shales, of which the hills are composed, are interstratified with occasional harder beds, the slopes are terraced; and when these thinly bedded, though harder, rocks prevail, the outlines of the topography are changed, and present angular surfaces, and give rise to another type of topographic features, which I have denominated Alcove Lands. The agencies and conditions under which all of these features have been formed deserve mention, and in this and following chapters I shall briefly discuss this subject, in a manner as free from technical terms as will be consistent with accurate description. The area north of the Uinta Mountains embraced in the survey is but small. Through the middle of it runs Green River, in a deep, narrow valley, the sides or walls of which sometimes approach so near to each other, and are so precipitous, as to form a cañon.

The general surface of the country on the north of this district is about a thousand feet above the river, with peaks here and there rising a few hundred feet higher; but south, toward the Uinta Mountains, this general surface, within a few miles of the river, gradually descends, and at the foot of the mountains we find a valley on either side, with a direction transverse to that of the course of the Green River, and parallel to the mountain range.

To the north the water-ways are all deeply eroded, the permanent streams have flood-plains of greater or lesser extent, but the channels of the wet weather streams, *i. e.* those which are dry during the greater part of the year, are narrow and much broken by abrupt falls.

The rocks are the sediments of a dead lake, and are quite variable in lithologic characteristics. We find thinly laminated shales, hard limestones, breaking with an angular fracture, crumbling bad-land rocks, and homogeneous, heavily bedded sandstones.

The scenic features of the country are alike variable. On the cliffs about Green River City towers and buttes are seen as you look from below, always regarded by the passing traveler as strange freaks of nature. The limestones, interstratified with shales, give terraced and buttressed characteristics to the escarpments of the cañons and narrow valleys.

FIG. 4.—BIRD'S-EYE VIEW OF THE GRAND CANON, LOOKING EAST FROM THE GRAND WASH.

One Bird, ECHO CLIFFS. Two Birds, KAIBAB PLATEAU. Three Birds, TO-RO-WEAP CLIFFS. Four Birds, HURRICANE LEDGE. Five Birds, SHI-VWITS PLATEAU.

Immediately south of Bitter Creek, on the east side of Green River, there is a small district of country which we have called the Alcove Land. On the east it is drained by Little Bitter Creek, a dry gulch much of the year. This runs north into Bitter Creek, a permanent stream, which empties into the Green. The crest of this watershed is an irregular line, only two to four miles back from the river, but usually more than a thousand feet above it, so that the waters have a rapid descent, and every shower-born rill has excavated a deep, narrow channel, and these narrow cañons are so close to each other as to be separated by walls of rock so steep, in most places, that they cannot be scaled, and many of these little cañons are so broken by falls as to be impassable in either direction.

The whole country is cut in this way into irregular angular blocks, standing as buttresses, benches, and towers, about deep waterways and gloomy alcoves. The conditions under which the cañons have been carved will be more elaborately discussed hereafter.

To the west of Green River and back some miles, between Black's Fork and Hardy's Fork, we have a Bad Land country differs from the Alcove Land above mentioned, in that its outlines are everywhere beautifully rounded, as the rocks of which it is composed crumble quickly under atmospheric agencies, so that an exposure of solid rock is rarely seen; but we have the same abrupt descent of the streams, and the same elaborate system of water channels. Here we have loose, incoherent sandstones, shales, and clays, carved by a network of running waters into domes and cones with flowing outlines. But still there is no vegetation, and the loose earth is naked. Occasionally a thin stratum of harder rock will be found. Such strata will here and there form shelves or steps upon the sides of the mountains.

Traces of iron and rare minerals are found in these beds, and on exposure to the air the chemical agencies give a great variety of colors.

region of buff, chocolate, and lead colored Bad Lands. This

* Extracts from Report of Major J. W. Powell on *The Exploration of the Colorado River of the West*. Washington, 1875.

THE CARIBOU SILVER MINES, COLORADO.

Staff Correspondence of the Engineering and Mining Journal.

The elegant illustrated supplement which accompanies this issue of the ENGINEERING AND MINING JOURNAL will convey to the reader, no matter how slight may be his acquaintance with the Far West and the details of silver mining, a very fair idea of this noted mineral district. Aside from the notoriety occasioned by the great resources of this belt of mines, and their productiveness since being opened, Caribou is well known in financial circles in the East and abroad as the *locus* of the Mining Company Nederland, an organization which, in its inception and operations, possessed many points of similarity to the English Emma Mining Company of Utah, and, like it, was based upon an unusually fine silver mine, which the avarice of speculators for a time ruined. It is intended in the following paper, after giving a brief history of the camp, to describe the principal mines, and to call attention to those characteristics of the district which pre-eminently make it a favorable place for the investment of capital in mining. Taking all things into consideration, the results of money spent there have been already so favorable that there are good grounds for belief in the future of the district. Communities, no matter how favorably situated, in their youth must pass through the ordinary tribulations of infancy, and this is especially the case with mining districts, in which cool-headed capitalists are so liable to lose their prudence and become reckless, and where also there is an almost unlimited scope for the operations of the pure speculators, whose transactions never fail to pass outside the limits of legitimacy, and who as invariably either retard growth by being discovered in their wild-cat enterprises, or unduly and unhealthily hasten it by being successful in their schemes.

Caribou Hill and vicinity was visited by many companies of prospectors a s early as 1860 and 1861, but as no gold in any quantity was found no developments were made, and the entire stretch of country lying between Gold Dirt and Wide Awake on the south, and Ward on the north, and which is now an almost continuous silver belt, was regarded as barren ground. In those years it was not supposed that silver mines existed in Colorado, and no search was made for the metal. Ten years later, however, when Georgetown had grown to be a thriving silver mining camp, and explorations had shown that the same element existed in paying quantities in Summit and Park counties besides, the ground was again looked over carefully, and the famous Caribou Mine opened. So rich was this vein found to be that a tremendous excitement broke out, and a rush for the new district was made which, in a few months, built up a flourishing little town at the head of Beaver Creek, and covered the hillsides in every direction with locations. Of course, there was a relapse shortly, from the simple fact that every mine discovered did not pay as well as its owners imagined it would, or as well as the Caribou ; but enough good veins were found to insure the permanence of the district, and with remarkable rapidity many of these were converted from prospect holes into paying mines. Fortunately for the district the attention of one very wealthy capitalist was drawn to it early in its history, and to his determined and persevering efforts the town and district is to-day indebted for much of its present consideration. This gentleman, Mr. A. D. Breed, of Cincinnati, purchased a half of the Caribou vein, and undertook the development of the same. In 1873 he had built a reduction works in a little park on the Middle Boulder Creek about four miles away, and was shipping silver bricks from his own mine and buying such ores as the camp afforded otherwise. By this time the Sherman, No-Name, Poorman, Seven-Thirty, Idaho, Boulder Co., Sovereign People, Grand View, and others had opened into good pay, and were attracting the notice of capitalists. At this point, Breed, abandoning legitimate mining, bonded the other half of the Caribou vein, and effected a sale of the entire property in Holland for $3,000,000, a figure about six times greater than it should have been. When this Dutch company took hold, times were apparently at their best in Caribou. A number of other sales were made on the strength of the Caribou transaction, all, or nearly all, being at too high figures ; money was spent lavishly in questionable ways, and, in fine, times were "flush."

It required but a short time to touch bottom on the most of these operations. In the winter of 1875–76 the Dutch company, after a desperate struggle with circumstances, went to pieces, and almost simultaneously all other enterprises were checked. For over a year the district was completely prostrated. At the opening of the present year, however, the work of reconstruction had begun, and this has gone forward since with great steadiness, till at the present time the camp shows all the indications of healthy growth, and every promise for a successful future. It will be rather severe to apply to this district the test of the balance-sheet, for the one great operation in which Caribou is best known, by its magnitude and the greatness of its failure, overshadows and hides many successes. It will not do to avoid the trial, however. The questions are : First. How much money has been spent in opening the mines of the district? Second. How much bullion has been produced and permanent values created? Third. Has the operation been a financial success or not, and to what extent?

Expenses.—These include the cost of all legitimate mining work on the belt, of mills, mine building, machinery, and improvements (permanent), and of ore-reduction. To this may be added the money spent in purchasing mining property, or the proportions of such amounts as were actually received by sellers of mines, and the amounts spent in commissions to promoters of sales. Finally, the cost of patents, etc.

The item of commissions is one that, legitimately, should not be included in this estimate, any more than an item of "defalcation" in a calculation of the profits and losses of the banking business.

Mining Works:	
10,000 feet of shafting, at $20 per foot	$200,000
18,000 feet of levels, at $10 per foot	180,000
4,000 feet of tunneling, at $15 per foot	60,000
15,000 fathoms of stoping, at $25 per fathom	375,000
Mills, Mine Buildings, Pumping, and Hoisting Work. :	
Mills (three)	200,000
Mine buildings	50,000
Mining machinery erected	100,000
Tramways, cars, tools, etc	25,000
Ore Reduction :	
46,000 tons, at $20	920,000
Capital consumed in Purchasing :	
Received by sellers	$1,500,000
Received by promoters, brokers, etc	2,000,000
Miscellaneous :	
Cost of patents	20,000
Superintendence, agents' salaries, etc	150,000
Handling and transportation of ore	140,000
Unknown extras	250,000
Total	$6,170,000

This represents all the money spent directly or indirectly on the Caribou Silver mines from their discovery up to the close of 1876. It is a much larger sum than one would expect could be spent in the improvements visible, but as shown fully one-third was spent in speculative operations. The assets of and income from the camp consist of bullion and ore produced, cash received from sales, and cash value of permanent improvements ; the last item covering the value of mills and machinery, and the value of individual mines as judged by their past productiveness. These foot up as follows :

Bullion and ore sold	$3,120,000
Cash received from sales	1,500,000
Value of mills and mine machinery	150,000
Mining property (auction valuation)	500,000
Total	$5,270,000

It appears, therefore, that if the Caribou Mine had been sold at a price commensurate with its actual value, instead of having been traded at a figure six times too large, which entailed a heavy burden on the entire camp, the district, now in its eighth year, would show a balance of $1,100,000 in its favor, after having accomplished, in a large measure, its own development, and creating a community of 500 souls, who find in the continued prosecution of work on the mines a permanent means of support. This is certainly a fair record, if one will take into consideration the many difficulties attending the inauguration of quartz mining, the complete poverty of the original discoverers and workers of the mines, the distance of the camp during the first four years of its existence from an ore market, and natural obstacles to be overcome in a locality situated near the crest of a great mountain range, 10,000 feet above sea level, and just upon the border of eternal snow.

One may reach Caribou now with great ease and comfort. The valley branch of the Colorado Central Railroad comes within 20 miles of the town, and the Black Hawk branch within 18 miles. From either terminus daily stage lines run throughout the year, and make the short journey, through magnificent mountain scenery, in a few hours. Arriving there, the traveler finds excellent hotel accommodations, and a lively little town surrounded by low hills, whose slopes are thickly covered with dumps, shaft houses, prospect holes, and other marks of the miner. The belt of mines is about four miles long and a half mile in width, with a general course a few degrees north of west. An examination of the plat in the engraving will give a general idea of the topography of the belt. It is divided into three parts, viz. Caribou Hill, Idaho Hill, and Boulder County Hill. In the center of our illustration is an excellent view of the first, taken from the little park north of Caribou, through which courses the North Boulder Creek. West of Caribou Hill the mountains rise rapidly and suddenly, culminating from five to ten miles off in the Range, whose peaks rise to a height of thirteen and fourteen thousand feet above sea level. A few hundred feet above the principal mines, timber ceases, and in the deep bends and horse-shoes above rest immense banks of eternal snow, each covering many acres, and ranging in depth from 10 to 50 feet. The vignettes on the sides of our supplement illustrate two of the most striking features of this magnificent scene. When the district was first prospected by the miner, Caribou Hill was thickly covered with heavy and dense timber. The needs of the mines and the miner have gradually despoiled this feature, and in its place are now seen the regular mounds of white rock marking the courses of the veins, and the dozens of rude shaft houses.

As shown by both the plat and prospective view, this hill is cut by a large number of silver veins, which cross and recross each other in nearly every conceivable direction. Closer study of the hill shows three distinct sets of lodes of different ages, and of these the east and west fissures are the oldest.

The ores produced by this belt of mines are mainly of silver. Following its course eastward more gold is found, and as the country lying between these veins and the South Boulder becomes known mineralogically, it will probably be shown that there is a continuous line of veins passing gradually from the characteristics of silver ore to that of gold as the Gilpin County belt is approached. The Caribou ores are highly quartzose, carrying a little lead, copper, zinc, and iron, (perhaps 8 per cent. altogether), the silver existing in the condition of black sulphurets and native metal. The country rock is granite and gneiss, showing in various places all the varieties of these two formations. Through the eastern slope of Caribou Hill courses an immense deposit of magnetic iron ore, which has been traced across the country for miles, and which is from fifty to one hundred feet in width.

THE MINES.

The two great mines of the camp are the Caribou and Native Silver. On the former work has been prosecuted to the depth of 600 feet, and on the latter 300 feet. Though not connected underground, there is no reasonable doubt of their both being on the same vein, and the two companies, instead of expending all their profits in litigation, have decided to unite. Their combination results in one of the finest mining properties to be found in the West. The vein is undoubtedly the principal lode of the hill, and in spite of the mismanagement the Caribou received at the hands of the Holland Company, and the butchering it underwent when that organization failed and the property passed for a time into the hands of the miners to whom the Hollanders had fallen in debt, it has never yet failed to respond handsomely to every foot of development put upon it. The Native Silver claim, which, about a year ago, was sold to a strong and wealthy Philadelphia company, has produced very finely for the amount of development made. The production of the two has been, since their discovery, not less than a million and a half, and probably much more. Both mines are in good condition, so far as underground working is concerned, and, as shown in the section at the top of our illustration, are being developed in a systematic and convenient manner, and with a due regard for the future of the property. Connection will be made between the two mines underground shortly.

On the surface the Caribou is supplied with magnificent hoisting machinery, and on the Native Silver claim there are also good appliances for this work. In the former, machine drills are being used to a considerable extent in both sinking and drifting. The vein is a strong and well defined fissure, seldom completely barren and frequently broadening out into pockets and chimneys of large extent, which, up to the depth already attained, have been found to lie in the

vein with much regularity and system. A tunnel entering the eastern base of the hill cuts this vein 300 feet below the surface, and drains all the upper workings, besides furnishing a course for air. Although not at present used for any other purpose, in time this tunnel will probably be used as an outlet for the low grade or concentrating ore of the mine, which will probably be treated in a mill to be erected near its mouth.

The Caribou Company owns a large amalgamation mill, of 20-stamp power, at the little town of Nederland, a short distance below the mine on the Middle Boulder. It is fitted with Bruckner cylinders and pans, and has produced many hundred thousand dollars in silver bullion. Statements of several campaigns in this mill, when under the managements of Mr. Burlingame and Mr. Cowe, have appeared in the JOURNAL. Careful work has shown that the Caribou ores may be worked by roasting, chloridization and amalgamation to 87 per cent. of their assay value, at a cost not over $14 per ton. This mill has shown the best general results of any amalgamation establishment we are acquainted with. Under the consolidation it will probably be somewhat remodeled and improved, and possibly the system will be changed to the leaching plan, which has proved so satisfactory in the New Jersey Company's works. The latter, known as the Native Silver Leaching Works, are located in the town of Caribou, and have been in operation less than a year. The plant consists of a ten-stamp battery, one five-hearth reverberatory for roasting and chloridizing, and a full complement of leaching and precipitation vats. The process is known as chloride leaching, and is covered by patents. It may be briefly described as follows: After fine crushing in stamps the ore is roasted and chloridized by any of the ordinary furnace methods. It is then dumped into large wooden vats and mixed with the dissolving liquor, which consists of various chlorides, maintained by regenerating appliances at a specified strength. After thorough agitation the liquors are drawn off, first into settling tanks, and then into precipitation vats. In one portion of the latter the silver is precipitated on copper plates, and in another the copper is saved on iron. The details of the mill are as follows:

Stamps.—Dry crushing; weight of head, 750 lb.; number of drops per minute, 100; fall, 8 inches; capacity, 10 tons.

Furnace.—Outside measurement, 12 x 59 feet; 5 hearths. The charging hearth is in the center, and from it the ore is raked both ways. Fire box at each end. The central and upper hearth is called the heating hearth, adjoining it are the two oxidizing hearths, and following these the chloridizing hearths. Each is provided with proper stirring doors. When full the furnace contains 3 tons, one ton being on the upper or heating hearth, and the balance in half ton piles distributed on the other four. It will deliver a ton of roasted and chloridized ore every two hours, consuming from 50 to 80 lb. of salt per ton. The consumption of fuel (wood) amounts to four cords per day. A chloridization of 90 to 95 per cent. is effected.

Liquor Vats.—There are 5 in number, 9 feet in diameter, and 5 feet in depth. In these the dissolving liquors are stowed and drawn off when needed.

Agitating Vats—Five in number, of the same size as the liquor vats. The charge of ore is agitated 4 hours with the dissolving liquor. The solution is then settled and drawn off by siphon decantation, and, fresh liquor being put in, agitation is resumed for 3 hours more. If the ore is a heavy one, a third agitation is resorted to. From 93 to 97 per cent. of the silver in the ore is leached out of the pulp in this part of the operation.

Settling Vats.—Five in number, 9 feet in diameter, and 4½ feet deep. In these the pulp is carefully washed, and all the soluble salts drawn off.

Precipitation Tanks.—There are 12 of these for silver, and 7 for copper. They are 4 feet in diameter and 2 feet deep. Emptying, of course, into each other. At the end of each series is a mud-trap.

The mill is driven by a 50 horse-power engine, supplied by 2 boilers, which consume 2 cords of wood per day. The prices paid for labor are as follows: Head roasters, $4; head leachers, $3.50; engineer, $3.50; stamp feeders, $3; ordinary labor, $2.75; fuel costs $3 75 per cord delivered in the yard of the mill.

The supplement shows two handsome views of these mills. The New Jersey or Native Silver mill is, probably, the most elevated reduction establishment on the continent.

The No-Name & Sherman Company own two valuable mines on Caribou Hill, one of which, the No-Name, is shown among the sections in our illustration. It is a cross vein having an east and west course, and crossing the Caribou. The main shaft is sunk to the depth of over 500 feet, and a number of levels east and west have been driven. The vein has produced, since its discovery, in the neighborhood of $400,000, some of this being ore of extraordinary richness. Plates and nuggets of solid silver worth from $10 to $200 each have been taken from this lode, and continued development in depth and along its course show it to be a property of great value. The Sherman is a lode parallel to and a short distance below the Caribou. It is sunk to a depth of nearly three hundred feet and has produced handsomely. It is intersected by the Caribou Tunnel at a depth of 210 feet, and may advantageously be worked through that entrance. A cross-cut is being driven from the No-Name to the Sherman and when these are connected they will probably both be worked through the No-Name shaft. The company owns a leaching mill on the North Boulder, about four miles from Caribou, in which a large amount of ore has been worked. At present the mill is not running, it having been found that the mines were not sufficiently developed to keep it steadily supplied. The management are now engaged in the work of putting the mines in better shape, and when this is done the two will constitute one of the finest properties in the district.

BELCHER.

This mine, now idle, is developed by a 120-foot main shaft, and another not so deep which was sunk on the El Refugio claim, which subsequently was shown to be the same as the Belcher. About $3,000, as nearly as can be ascertained, has come from the existing openings upon the mine, besides which there is a good showing of ore in the stopes. The vein is a cross lode, and wherever intersected by the longitudinal veins of the hill gives indications of rich pockets of mineral. Two of these chimneys of ore are partially opened, and if there were facilities in Caribou for mine owners who have no mills to sell their ore at good prices, the Belcher would immediately be an important producer. As it is the ore taken from the vein has more than covered development expenses. The bulk of the lode is, of course, low in grade (from $30 to $60 per ton), and concentration works of some kind are necessary to its profitable working.

POORMAN.

The shaft houses of the Poorman and Sherman join each other, and there is not 30 feet in distance between the two veins. The Poorman, however, bears around somewhat to the south of west. It is one of the noted mines of the district, and has the reputation of having yielded richer ore than any other on Caribou Hill. Its actual production, including some third-class ore yet unsold, has been in the neighborhood of thirty or forty thousand dollars. Only a small amount of stoping has been done, because the mine has been worked almost wholly for development. A fine course of ore is shown in the main shaft, which is a little over 200 feet deep, and when the owners find a good means of disposing of their ores, the mine can be made to yield largely at once. The vein of mineral is, in places, over two feet in width, and for considerable distances averages 10 and 12 inches. Several pay chimneys have been developed by the work already done, and explorations east and west will, without doubt, reveal more. The mine is regarded as among the best of the district. It is at present idle, for reasons which will be shown further on.

BOULDER COUNTY.

The Boulder County lode is a gigantic fissure coursing through the hill of the same name. It carries the ordinary silver ore of the district, and in addition a small quantity of gold. It has been developed by a number of shallow pits along the surface, and by two adit levels, running in from the southeastern brow of the hill above the little hamlet of Cardinal. Only one of these—the lower level—is of any extent, but in each the vein shows a fine body of mineral, which will mill from $50 to $100 per ton as it comes from the mine. It has been found almost useless, however, to attempt to work the property to any advantage until concentration or reduction works are built for its ores, and consequently its development has proceeded slowly and hesitatingly. In doing such work as is shown in the section given on our illustration, several small bodies of richer ore were found which have paid a profit over all expenses, and certainly more extensive explorations of the vein will reveal many more similar high grade deposits. This mammoth vein should, however, be worked from wall to wall, and enough is known of its character to insure the enterprise being profitable if carried on upon such a basis. The vein lies most advantageously for extended development. Adits may be driven directly on the vein from the gulch back of Cardinal, which will gain a depth of 300 to 400 feet for a long distance. With concentrating works at the mouth of the mine, a salable product in large quantities can be made which would yield undoubtedly a handsome profit. The vein is one of great size and strength, and has been traced with hardly a break for nearly a mile. We hope to see it shortly in operation. Its development on a broad and liberal scale constitutes one of the finest openings for enterprise to be found in the district. As will be seen on examining the section of the Consolidated Belt Tunnel in our supplement, the Boulder County lode is directly on the line of that bore, and will ultimately be opened by it at a depth of 600 to 1,000 feet below the surface. This tunnel is now advancing steadily into Boulder County Hill.

EXTENSION LODE.

This is one of the many pieces of idle property on Caribou Hill which should not be left unworked any longer. It has received some development by shallow pits and shafts, and shows a strong and well-defined vein of silver ore of fair grade. Our illustration gives it in section, and shows a plan of the hillside in the vicinity. Its location is favorable for development, and the vein in neighboring properties has shown well for what work has been put upon them. It is thought by many to be an extension of the Caribou, but this is immaterial, for not enough has been done to prove or disprove such an idea. The owners of the mine expect to reopen it as soon, as there is an ore market in the camp, for mineral of moderate value, which, it is greatly to be hoped, will be in the near future. The Extension lode lies across the line of the 2-17 Tunnel, and will be cut by it at a depth of about 400 feet below the surface.

SPENCER AND GRAND COUNTY.

There are two parallel veins having nearly the same course as the No-Name, and only 40 feet apart. Their nearest neighbors to the west are the Missouri Valley and Columbia.

The Spencer is sunk to the depth of 116 feet. At the depth of 60 feet levels have been driven east and west to the total length of 100 feet, and at two points about 100 fathoms of ground have been stoped out. In doing this work about 40 tons of ore have been produced and sold, from which about $4.500 has been realized, showing the mineral to be worth something over $100 per ton. This is an unusual yield when it is considered that nearly the whole amount mined came from shafts and drifts, which are never calculated upon to be productive. The mine has much more than paid for itself. It is covered by a substantial shaft house, the shaft is well timbered, and the mine is in good shape. A goodly amount of ore is also in sight and waiting to be extracted. The mineral produced by the Spencer is largely high grade, running from $200 up to $600 per ton. Of course, in taking out such material much is produced that is of a poorer quality, which requires dressing works for its economical working. The owners of the Spencer are contemplating the erection of concentrating machinery of some kind to handle their ore. The mine is now opened sufficiently to determine very fairly its comparative value, and unquestionably it takes a good standing among the lodes of Caribou Hill. By extending the present drifts north and south to a total length of say 500 feet, and opening a similar set of drifts at the bottom of the shaft for an equal distance—an operation which will cost in the neighborhood of $10,000—about 2,000 fathoms of stoping ground will be opened. Making ample allowance for barren ground, and judging by the value of the ground already opened, this may certainly be calculated at $100 per fathom, which makes the value of the blocks opened by the above mentioned workings $200,000 gross.

The Grand County, from the small amount of work done upon it, has yielded $700, much more than paying all expenses. In character of ore and other ways, it is very similar to the Spencer, and, being parallel and so close, could most advantageously be worked from the more developed mine. The two veins naturally go together, and will be found to be the main fissures of the little bunch of lodes in which they lie. The Grand County is at present idle, but will not remain so long, as there is good ore in sight in the shaft, and every inducement to continued operations. The question of a satisfactory market is the only one which deters further prosecution of labor upon it.

On Idaho Hill, directly north of the town, lies the

MONITOR-LULU.

The section given in our supplement shows that considerable work has been done on the vein. This spring the company, which is a Rochester (N. Y.) organization, put up a handsome new shaft house and hoisting machinery, and has begun the development of the vein upon a large scale. Last year was spent almost wholly in testing the lode and in pushing some developments rendered necessary by conflicting claimants. The question of title is now finally and completely settled, the owners are satisfied with the value of their lode, and have determined without farther hesitation to open it thoroughly. Already a mine of

demonstrated value, its future productiveness is beyond any reasonable doubt. The various openings upon the mine have yielded, altogether, something over $3,000.

TWO-SEVENTEEN TUNNEL.

This enterprise, one of the most important in the camp, occupies a position on the northwestern face of Caribou Hill, a short distance above its base. The claim is 5,000 feet in length, and its line bears directly underneath the center of the Native Silver Mine, and extends far beyond the brow of the hill. It is now in 300 feet, and is the handsomest piece of mining work of its kind to be found in the district. The tunnel is 8 feet clear in the bottom, 7 feet in the top, and 5½ feet high, with a tramway on one side, and ample room on the other for a return track. The timbering is an especially fine piece of work. The company owning it is a Cincinnati organization, having Judge William H. Woods as resident agent. The section given in our illustration shows the number of veins that will be intersected in driving it under the crown of the hill, at which point a depth of about 500 feet will be gained. The tunnel claim holds a large amount of improved and unimproved property, and its benefit to the numerous veins lying on its course will be immense. Deep mining is the order of the day in every part of the West. With those who understand vein formations it is evident that depth must be gained before stoping ground to any extent can be opened, and in this lies the profits of mining. In the matter of drainage, also, tunneling is a necessity and a measure of economy. The 2-17 Tunnel will open a section of Caribou Hill at present but slightly explored, except on the surface, yet which gives evidence of being as productive as any part of the mountain.

About two and a half miles below the town, and on the north slope of Beaver Creek, is the entrance to the

CONSOLIDATED CARIBOU BELT TUNNEL.

By referring to the plat of this belt of mines, it will be noticed that there is a wide group of veins at the eastern end of Boulder County Hill, of which the Boulder County, Trojan, Sovereign People, Cambria, New York Central, and Arlington are the most important. Directly through the center of these is the line of the Caribou Belt Tunnel. The section given in our illustration shows the profile of the hill and the disposition of the veins. The tunnel is now 600 feet in length, and driving ahead steadily. Three fine veins have already been cut, each of which has been prospected to a greater or less extent, and in all ore has been reached. It is the intention of the company, which is a Montreal and Denver organization, to push ahead steadily into the mountain, proving up each vein as passed until sufficient has been done to warrant the erection of proper dressing works. This condition the company already think is realized. Tests have been made on ore taken from the veins opened, and unusually good results obtained. There is a fair chance that the erection of works will begin this fall, but certainly they will be built during the next season.

Meanwhile the tunnel will go ahead steadily. When the Boulder County lode is reached, which is known to be the master fissure of the hill, a magnificent opportunity will be offered for drifting westward on that vein through the entire extent of the Caribou belt of mines. Were this plan followed out, Idaho and Caribou Hills would be undermined to a depth of 1,200 to 1,500 feet. Of course, this is the work of years, but its accomplishment in the future is certain. The company owning this tunnel has the means and the confidence in the value of its enterprise to push it ahead vigorously, and the developments up to the present fully warrant a continuation. In a short distance further the Sovereign People will be cut, of which much is expected.

The veins at this part of the Caribou District are carriers of gold to the extent of $15 to $30 per ton. They are generally broader and carry heavier bodies of ore than those nearer the western end of the belt, and, at the same time, the mineral is of a lower grade in silver. Concentration works are, therefore, more than ever a necessity. The Caribou Belt Tunnel has a good location, and commands ample water for large works.

OTHER MINES.

The district includes a number of other mines of value, for which there was no space in our illustration. The most important of these on Caribou Hill are the Seven-Thirty, Missouri Valley, Grand View, and Mount Vernon, all of which have been developed to the depth of 100 feet, and together have produced in opening about $30,000. The Ten-Forty, Peabody, Great Republic, Monongahela, IXL, Columbia, Le Roy, Grecian, Brian Boru, and Dexter lodes are also good property, though as yet not extensively developed. On Idaho Hill, the Potosi, Silver Point, Idaho, and Nonpareil are fine mines. The Potosi is regarded as the east continuation of the Caribou, and resembles the latter in many ways. It is opened by about 200 feet of shafting and 125 feet of drifting, in all of which the lode shows a fine vein of ore. About $18,000 gross has been produced, and $50,000 placed in sight by this work. The mine is well provided with surface works, and is undoubtedly a valuable property. The Trojan, Sovereign People, Arlington, and New York Central are, besides the Boulder County, the most promising veins at the lower end of the belt.

It may appear unreasonable that with such excellent prospects so few, comparatively, of the Caribou mines are at present working. The reason, however, is plain. There is no market for the bulk of the ores. The medium and high grades, running from $75 upwards, find a sale at fair prices at the Native Silver leaching mill or at Black Hawk, but nothing below that in value can be profitably mined. The district is greatly in need of concentration works of large capacity, which will utilize everything worth $20 and over per ton. Of this grade the camp can already furnish many thousand tons. The ore is also a simple one to concentrate.

There is need, also, of more capital in the mines. A vast amount of preliminary and experimental work has been done by the miners, and enough to show that the veins of the district are worthy of extensive exploration. Beyond this point a man without means cannot go. The mines need hoisting and pumping machinery. It is useless to expect more than one or two out of a dozen to furnish the cost of these improvements from their own resources. Nearly all need help, and we can assure capitalists that a rigid examination of the rescoures of the camp will not be to its disadvantage.

HYDRAULIC MINING IN CALIFORNIA.*

By Aug. J. Bowie, Jr., A. B., Mining Engineer.

(*Continued from page* 89).

THE DUMP.

Without the dump, hydraulic mining is an impossibility. On this point too much stress cannot be placed. It must be borne in mind that where thousands of cubic yards of detritus are being daily washed from their original positions into cañons, valleys, streams, or rivers, it is not the accumulations of a few months which must be looked to, but places must be kept at lower elevations, where the immense hills of gravel, when "hydraulicked,"† can be redeposited, keeping in view the fact that in general a very much larger superficial area is then requisite than was originally occupied by it.

FIG. 5.—BAD-LAND MOUNTAINS, NEAR BLACK'S FORK, COLORADO RIVER.—*See page* 104.

It sometimes happens in claims near to one another working with the same dump and on a light grade, that the bedrock in one is lower than that of the other. Where this occurs the claim with the highest bedrock should be the last run off, so as not to interfere with the dump of the lower claim. An illustration of this condition of affairs is afforded by the Patricksville Hydraulic Claims, in Stanislaus County, where three claims, one tailing over the other, are annually worked. During the last two years the lowest claim, called the Chesnan, has been closed in the fall, its dump giving out, whilst the upper ones continued work. With the return of spring freshets, the cañon has been cleared of the debris, and washing has been regularly resumed in the Chesnan, continuing as long as the dump lasted. The upper claim is closed whilst the Chesnan is working, to avoid the too rapid filling up of the creek. If the two higher claims were worked at the same time, the Chesnan would soon be closed for an indefinite period.

TAILING INTO STREAMS.

It is supposed by many that the want of dump is remedied by discharging into a current or mountain rapid. This undoubtedly would overcome many of its deficiencies were the detrital accumulations to border on large, rapid, and well confined streams; but in the mountains where the gold-bearing deposits are found, the rivers are narrow, only running water in quantity during the winter and early in spring.

AN EXAMPLE ILLUSTRATING ONE OF ITS RESULTS.

Some of the annoyances and difficulties arising from tailing into a stream can be seen on the Tuolumne River below La Grange. The river for seventeen miles above the town has a fall approximating eighteen feet to the mile. It is a large mountain stream (fed by the snows and rains of the Sierra Nevada), well confined by abrupt banks.‡ At La Grange § its width is five hundred and twenty-

* A paper read before the American Institute of Mining Engineers, at the Wilkes-Barre meeting, May, 1877.

† The words "hydraulicked" and "hydraulicking" are the coinage of the California placer miner, and custom has here sanctioned their use.

‡ The river opposite the old French Hill dump is 500 feet wide.

§ At the Ferry. The grade of the river from here to its mouth is only a few feet to the mile.

five feet. Three hundred yards below the town opposite the Light Claim it widens to seven hundred and fifty feet.* Down the stream from this point the hills for the succeeding three or four miles recede, but subsequently form prominent banks of the river. During high water in the winter opposite the Light Claim at its greatest width, its average depth was ten feet,† the center of the channel being fourteen feet deep. When the La Grange Hydraulic Mining Company commenced work in 1872, the bottom of the channel was a few feet deeper.

NUMBER OF CUBIC YARDS OF GRAVEL DISCHARGED INTO THE RIVER.

The Light Claim was hydraulicked in 1873, and by June 23, 1874, 720,086 cubic yards of gravel had been discharged into the stream near the claim, and during the same period 975,064 cubic yards were dumped into the river from the Kelly and French Hill properties. The results at the expiration of twenty-one months were, that the channel opposite the Light Claim was filled up, the sluices were run out of grade, the river bed was shoaled on all sides, the water of a former rapid stream straggled over the accumulated debris with a barely perceptible motion, and, it is hardly necessary to add, that the claim was closed.

EFFECT OF SPRING FRESHETS ON THE DUMP.

The spring freshets of 1875–76 were unusually severe, clearing the river at the claim for its entire width, and leaving a dump of over eleven feet along its west bank. This spring‡ (1877) work was resumed, and since then 48,280 cubic yards have been hydraulicked in the "Light," and 212,346 cubic yards from French Hill, which is a quarter of a mile up stream. At present§ the river is filled up nearly its entire width to the height of the sluices, and the water is confined to a strip thirty feet wide discharging one foot deep over a bar.

GENERAL OBSERVATIONS ON DUMPS.

Where a small amount of tailings is discharged into cañons, winter rains and spring freshets suffice to clean them out, but where the quantity is large, in spite of the water the ravines gradually fill up, and hydraulic mining in those localities ultimately ceases. It occasionally happens that the want of dump room is obviated by a tunnel, and by means of it the tailings are conveyed into large and precipitous ravines, consigning them to the action of time and water for their further removal.

THE GRADE.

The facility with which gravel can be moved by water is greatly dependent on the inclination of the sluices. The question of grade is, therefore, a matter of vital importance, as the fate of an enterprise is frequently contingent on its solution. In its investigation and careful determination great skill and ability can be displayed. It necessitated the study of the deposit, the ascertaining of the position of the channel, the depth of the bedrock, covered generally with hundreds of feet of detritus, and the calculation of the costs of the work, with estimates of the yield of the ground, all of which afford a fine field for the engineer.

To obtain accurate information on these points is, then, a prime necessity for the hydraulic miner. The explorations of the North Bloomfield Company furnish a remarkable instance of the extent to which such preliminary work has been successfully carried out.

AN EXAMPLE OF PRELIMINARY WORK.

To determine the value of their claims and the feasibility of hydraulicking them, four prospect shafts were sunk to ascertain the position of the channel and the depth to the bedrock. Of these shafts No. 1 alone struck the main channel, developing 135 feet of blue gravel,‖ and finding bedrock at a depth of 207 feet.

Drifts were driven from the bottom of this shaft a distance of 1,200 feet on the course of the channel, and its width was approximated at 500 feet. The aggregate length of the channel explorations was over 2,000 feet. The gross cost of the entire prospecting work was $63,956.20.**

CONCLUSION REACHED.

Having ascertained the value of the gravel, the depth and position of the bedrock and channel being determined, the company decided to open their mines, and a working tunnel was then located.

OBSERVATIONS ON THE FACILITIES REQUIRED FOR WASHING GRAVEL.

The profitable removal of the detritus by the hydraulic method requires that the greatest facilities should be afforded for the rapid transport of material. Where a dump can be obtained and it is practicable, open cuts are run sufficiently deep in the bedrock to bottom the channel. In those cases where open cuts are not serviceable, a tunnel is requisite.

TUNNELS AND THEIR LOCATION.

The object of tunnels in gravel mining is to afford suitable means for the hydraulic washing of the auriferous deposits, and from their general relative positions are fitted with sluices†† to catch the gold from the washings. The size of the tunnel is dependent on the requirements, viz., with a six-foot flume it should not be less than 8 by 8 feet; with a four-foot flume, 5 by 7 feet.

The locating of drainage tunnels, or in the opening of hydraulic claims which do not require tunnels, that place is to be selected from which the sluices running on the straightest practicable line with a given grade can bottom the major part of the "pay deposit" at the smallest possible expense.

ALLOWANCES REQUIRED TO BE MADE.

In the establishment of this line due regard should be taken of the dump, and allowances made for possible contingencies arising from changes, such as depressions and holes in the bedrock. It is advisable, besides allowing for grade and dump, to run the tunnel or cut from a point sufficiently deep to strike from fifty to seventy-five feet below the top of the bedrock, at the point where connection is to be made with the surface.

This additional depth ‡‡ is a matter of judgment, and in determining it one should be governed by the character of the bedrock, extent of ground to be worked, and the position of the shaft. It is always an easy matter to ease up the grade, but if the main line of drainage is once fixed, and proves to be too high, it is a source of endless expense, and is frequently fatal to the enterprise.

THE GRASS FLAT TUNNEL.

At the Pioneer Mine, Grass Flat, Plumas County, the original owners in opening their claim ran a tunnel 4,000 feet long. When midway in the channel the tunnel was found to be twenty-two feet above the bedrock. The sum of sixty thousand dollars expended in this work was a total loss, and the owners subsequently were compelled to dispose of their property.

The general difficulty in locating tunnels is to find accessible places which do not involve heavy expenditures. "Some idea of the extent of these preliminary operations may be obtained from the following memoranda concerning several tunnels on the ridge (Nevada County) driven within a few years past:*

Name of Mine or Tunnel.	Locality.	Length of Tunnel.	Average Grade of Tunnel.		Reported Cost.
			Inches per Sluice-box.	Feet per 100.	
			in. ft.		
Boston	Wool-ey's Flat	1,600	10½ to 12	7¼	$40,000
North Bloomfield	Humbug Canon	8,000	6½ " 12	4½	500,000 *a*
Farrell	Columbia Hill	2,200	6 " 14	3½	Not complete
English Mine	Badger Hill	1,400	12 " 14	7	
American	Below San Juan	3,900	10½ " 15	6¼	$140,000 *b*
Manzanita	Sweetland	1,740	7 " 14	4⅛	62,000
Sweetland Creek	Sweetland	2,200	8 " 14	4⅔	90,000 *b*
Bedrock	Below Sweetland	2,600	9 " 14	5¼	
French Corral	French Corral	3,500	8 " 14	4⅔	165,000

a With 8 auxiliary shafts, increasing the cost, but diminishing the time required.
b Not from official reports."

THE EXTENSION OF THE TUNNEL AND THE CONNECTION OF ITS HEADING WITH THE SURFACE.

When a tunnel is used to open a claim it should be driven well into the channel before any connection is made with the surface. The shaft which connects with the heading should be vertical.† Its size is one alone to be determined by convenience (4 by 4 or 5 by 9 feet in the clear) as circumstances may demand. Whilst raising from the tunnel due precaution should be taken against accidents arising from the rush of water, sand, and gravel which is liable to take place when the bottom of a deposit is tapped.

THE TIMBERING OF THE SHAFT, ETC.

To avoid any accident or trouble such as might be occasioned by caving of the shaft, it should be strongly timbered, closely lagged, and lined on the inside with two-inch lumber to within, say, eight feet of the surface. This top being the first washed off is used for fall. When in soft rock the shaft should be timbered close with timbers of the requisite size. These timbers are then lined on all four sides with blocks of wood from four to six inches in thickness set on the end of the grain.

The bottom of the shaft can be protected against wear by using pieces of heavy logs or sticks of twelve inches square timber stood on end securely bound together, or it can be paved with heavy stones, but in many cases the bare bedrock only is used. The last fifty to seventy-five feet of the tunnel which connects with the shaft should be heightened from eight to twelve feet, and at their junction the ground should be securely timbered and protected.

ON THE ADVISABILITY OF A SECOND SHAFT

With long tunnels it is advisable to sink a second shaft at a convenient distance from the heading. As a precautionary measure a man is sometimes placed in the tunnel to watch the runnings. This air shaft for such cases would be necessary, and should an accident occur at the main shaft by its caving or closing up, it would also afford the necessary facilities for reopening the work.

FIRST WASHINGS THROUGH THE SHAFT.

When the occasion demands that a claim should be opened by means of a shaft, the first washings through it should it be done with care, and the surface, within as great a radius as can be conveniently hydraulicked and drawn, should be cleared on all sides, before any descent is made by taking off the top timbers. Attempts to push this preliminary work have frequently caused an overcrowding of the shaft, resulting in its filling up or getting choked by caving. It is, therefore, essential that the gravel should be run so as to avoid the rush of material from caves, and to prevent the accumulation of rocks in the bottom of the shaft an excess of water should always be used.

TO BE CONTINUED.

ANOTHER CENTENNIAL TESTIMONIAL.

TO THE EDITOR: SIR—The German metallurgists who were entertained by our own last year paid a deserved compliment to Mr. Wm. G. Neilson, Secretary of the Centennial Committee of the Institute of Mining Engineers, by suggesting the presentation to him by the Emperor of the order of the Red Cross, Mr. Neilson's receipt of which you have already mentioned.

But the German Commissioners also paid another compliment in as graceful a manner. Upon recently visiting the residence of Mr. A. L. Holley, I found upon his library table a very beautiful casket of elaborately wrought bronze and ebony. Upon examination it disclosed a fine medal framed in the bronze cover, bearing the words "Verein zur Beforderung des Gewerbefleisses," also the name of the recipient, and the casket proved to be a portfolio inclosing, engraved on vellum, a certificate of Mr. Holley's honorary membership of the society above mentioned, which is the highest institute of applied science in Germany, the honorary members of which are very few. The certificate states that the honor was conferred (as I translate it) "in consideration of your eminent merits in the development of the mechanical part of metallurgical works, and especially in the advancement of the Bessemer process."

Upon being called to explain the discovery of this document on his premises, Mr. Holley stated that he understood it to be an additional acknowledgment by the German Commissioners to the courtesy of the American Institute of Mining Engineers. Mr. Holley was President of the Institute at the Centennial meeting.

As the matter thus seems to be one in which the Institute has an interest, I have taken the liberty to communicate it through the official organ. R.

* Extreme width during high water. Width at lower sluice 700 feet.
† Deeper in narrow places.
‡ April 10 work was resumed on top dirt.
§ Dry season—months of August, September, and October.
‖ This 135 feet of gravel yielded 46 cents per cubic yard.
** From the several drifts and breaks 21,614 tons of gravel were extracted, yielding $32,600 or $1.50 per ton. In one of the drifts the gravel paid 75 cents per ton, at a height of from 15 to 20 feet above the bedrock. The actual yield from all the drifts was about $2.75 per cubic yard, and as determined by sampling, $2.01 per cubic yard. For particulars see *Report* of H. Smith, Jr., C. E., N. B. M. Co., 1871, p. 17.
†† In the lower end of the N. B. tunnel no box sluices are used.
‡‡ Where the bedrock disintegrates on exposure to the air, *i. e.* soft bedrock, it is advisable to allow for considerable depth when practicable.

* EX. *Report Water and Gravel Mining Properties of the Eureka Lake & Yuba Canal Company.* By James D. Hague, M. E.
† Occasionally inclines are used.

THE STONE HILL COPPER MINE AND WORKS, CLEBURNE COUNTY, ALA.*

The following description, of the Ore Knob copper deposit in North Carolina, by Dr. T. Sterry Hunt,† shows very clearly that it is in all essential particulars similar to that at Stone Hill, Ala., and undoubtedly of the same origin :

"Beneath the gossan at Ore Knob is found in some parts an iron-black, friable, drusy, crystalline, sulphureted ore, inclosing grains of quartz, garnet, and magnetite, beside a black non-magnetic mineral not attacked by nitric acid. This ore contains about 36 per cent. of copper, and portions have the mineralogical characters of the vitreous and purple ores, while others contain a large proportion of iron sulphide, and approach copper pyrites in composition. Along the northwest side of the lode, at Ore Knob, is a veinstone of glassy quartz, carrying purple ore, but with this exception the whole breadth of the lode, so far as now opened, consists of these friable and imperfectly crystalline ores to a depth between 20 and 30 feet, where they are replaced by a more solid ore, consisting of an admixture of pyritous copper, with iron pyrites, carrying, on an average, about 12 per cent. of copper. . . . . It is very instructive to compare this deposit with those of Polk County, Tenn. (Ducktown), and of Carroll County, Va., which I have lately examined. . . . . In the report of Messrs. Trippel and Credner, as in the earlier published reports of Messrs. Whitney, Blake, and others, these deposits of Ducktown are indicated as conforming in dip and strike with the inclosing mica-schist, and not as fissure lodes. Notwithstanding their apparent intercalation, I am, however, disposed to regard them not as contemporaneous with the strata, but as subsequent deposits in rifts and fissures. . . . . I felt constrained to regard them as having been formed in the midst of the strata, and as apt in any part of distribution to appear as transverse veins. There are, it is true, in this immediate vicinity, impregnations in the mica schists which simulate closely those of contemporaneous origin; but the great masses of pyritous ores and other associated minerals, as disclosed in the deep workings of the East Tennessee Mine, have all the characters of the true veinstones. The massive pyrrhotite and chalcopyrite which form the metalliferous parts of the deposit are traversed by large crystals of zoisite, idocrase, hornblende, and pyroxene, the latter sometimes an inch in diameter and six inches in length. The hornblende crystals are often curved, and sometimes partially broken across, and their transverse fissures are filled with sulphurets, which are also occasionally interposed between the cleavage planes of the augite crystals. These silicates are sometimes incrusted with chalcopyrite, with galena, with blende, and more rarely with crystallized chalcopyrite; molybdenite is also met with. But for these associations of sulphureted ores it would be impossible to distinguish specimens of these silicates from those met with in the Laurentian veinstones, so well known to mineralogists, and the resemblance to the latter is still more complete in the great masses of white cleavable augite rock, which form portions of the veinstone, and in others which are an aggregate of long prisms of greenish hornblende imbedded in a gangue of white crystalline calcite. With these are associated varieties of finely fibrous hornblende, greenish, brownish, or snow-white in color. The disposition of these masses is more or less regular, and in some cases, at least, parallel to the plane of the lode. In one instance a layer of prisms of white hornblende, two or three inches in length, is arranged in a columnar manner, transverse to the wall, the interstices between them being filled with chalcopyrite. Layers of vitreous translucent quartz, with inclosed masses of sulphides, are also found, having all the aspects of ordinary quartzose veins. A pale cinnamon-colored garnet, sometimes in crystals half an inch in diameter, is also met with imbedded in quartz, or more frequently in chalcopyrite. The latter also occasionally contains large and fine crystals of mispickel. A collection of these various minerals and mineral aggregates, all of which I obtained last summer (1873) from the workings of the East Tennessee mine at Ducktown, would, I think, convince the student familiar with veinstones that this great deposit, whatever its attitude with regard to the inclosing rocks, is of posterior formation, and identical in the mode of its generation with ordinary concretionary veins. . . . . The great ore deposits of Ducktown are certainly very variable in breadth, ranging from 300 feet to not more than 20. . . . . At the same time the length of these is very considerable; one at Ducktown has been worked continuously for the black ores for very nearly a mile, and another has been opened for a still greater distance in Carroll County, Va. . . . . The fact is, these great pyritous lodes vary in composition in different parts, both horizontally and vertically. . . . . One of these interbedded lodes has been traced, in Carroll County, Va., for a distance of several miles, and opened in many places along a distance of about five miles. . . . . Other parallel lodes have been observed in the vicinity."

These facts, as to the persistence of deposits of this character, have an important bearing upon the value of this Alabama mine.

The Stone Hill deposit, though not so thick as those in which some of the Ducktown mines are opened, contains far less waste material than the latter. In fact, it does not contain any waste rock; and, what is of the greatest importance, its ore contains a much higher average percentage of copper than that smelted in Tennessee. The average in ingot copper, at the Ducktown works during the past year, was about $3\frac{2}{3}$ per cent. of the ore smelted, equivalent to an assay value of about $5\frac{1}{2}$ to $5\frac{3}{4}$ per cent., while at Stone Hill the average assay of the smelting ore has been nearly $7\frac{1}{2}$ per cent., and this can very easily be increased to 8 per cent., which should give a yield in ingot copper of fully 6 per cent.

Since the cost of treatment per ton of ore is almost independent of its richness, after the yield is sufficient to defray these charges, the surplus is nearly all profit. We can therefore scarcely overestimate the importance of the two and one-third per cent. by which the yield of this Stone Hill ore exceeds that of Ducktown. It represents, in fact, nearly so much net profit. In this report the author has preferred using the actual results obtained in working, hence makes no reference to the assays of specimens that run up to 20, 25, and 30 per cent., such as this, in common with most other mines, can show.

The mine openings at present are merely exploratory, though they are of such extent as to permit stoping in a number of places at the same time, and to afford thirty or forty tons a day if energetically pushed. Nevertheless, the first care of the company should be to adopt a systematic plan for opening and working the mine.

The levels can be driven 6 feet wide by 7 feet high at a cost of about $10 a foot run, and will yield about $3\frac{1}{2}$ tons (2,352 lb. each) of ore. The slope, 12 feet wide and 7 feet high, will cost, say, $30 per foot, and will yield 7 tons of ore to the foot, or sinking winzes will cost, when dry, about $15 per foot. It is scarcely necessary to add that all mine work should be done by contract. The contracts with the negroes, who are the laborers most available at Stone Hill, can probably be most advantageously made by the foot of holes drilled. A small number of skilled miners, to be paid by the ton of ore taken out, or on some other equitable basis, will direct the work and show the unskilled laborers where and in what direction to drill the holes in order to obtain the greatest amount of ore for the foot of hole, and to keep the levels and stopes in good condition. A judicious system of premiums for those who produce the best results at the least expenditure of labor would also aid in securing the maximum of economy. The deadwork, driving levels, sinking winzes and slope should be kept well in advance, so that a large amount of ore may be constantly in sight. No greater or more expensive mistake can be made in the management of a mine than the adoption of the "hand-to-mouth" policy.

MECHANICAL PREPARATION OF THE ORE.

This can be effected by a system which closely follows that used in the preparation of anthracite coal. The details of this system are described and illustrated in the report.

The ore is crushed in Blake rock breakers, sized in revolving screens, and picked on chutes inclined at such an angle that the ore will run slowly on them. The picking is done by boys sitting on each side of these chutes. This is considered less expensive and more effective than picking on revolving tables.

METALLURGICAL TREATMENT OF THE ORE.

The treatment in blast furnaces is for ores of this class unquestionably cheaper than that in reverberatories; but it necessitates a better preliminary roasting of the ore and a careful management in order to prevent the formation of "salamanders" in the hearth. Since these are both attainable elements of success, I have preferred this method of smelting to that in reverberatories as now in use. My estimates are also based upon the treatment of 45 tons of 8 per cent. ore per day. The ton used in this part of the works is 2,240 pounds; that in the mine and mill is 5 per cent. greater, or 2,352 pounds.

ROASTING IN KILNS.

Roasting can be effected most economically in continuously working kilns, the "deadness" of the roasting being regulated by the amount of ore drawn each day from the kiln. This roasting should be carried to a point where the first matte made from the ore in the shaft furnace will yield from 25 to 28 per cent. of copper. This would leave some 6 to 8 per cent. of sulphur in the ore. Taking the experience of works on the Hudson as a guide, there should be no difficulty in attaining these results. At this point sulphur ores are roasted down to less than five per cent. of sulphur in kilns 7 feet long by 4 feet wide and 6 feet high, which are charged each with about 140 cubic feet, or say 10 tons, of ore.

The roasting in kilns of this kind can be contracted for at much less than 50 cents per ton of 2,240 lb., which figure includes repairs, and shows clearly enough the economy and effectiveness of the system. When we take account of the quickness of roasting, or, in other words, the stock of ore undergoing calcination at any time, the advantages of kiln-roasting over that in piles are very apparent.

On the Hudson 1,500 lb. of ore are drawn from each kiln daily (at one operation), the roasting being carried down to less than 5 per cent. of sulphur. If 7 or 8 per cent. of sulphur were left, the amount that could be withdrawn daily would be increased; but assuming the same rate, 75 kilns, costing about $100 each, and charged with 750 tons of ore, would suffice for the supply of 45 tons roasted ore per day (assuming the weight of ore after roasting to be the same as before, which, practically, will not be much amiss).

In these estimates I have counted the cost of mining as $2.50 per ton on the ore as it comes from the mine. As 65 per cent. of this goes to the furnaces, the cost per ton of furnace ore is $3.85 (neglecting the difference between the tribute and long ton).

The fine dressed ore is mixed in a pug mill with 5 or 6 per cent. of clay, which cements it together, and at the same time assists the subsequent fluxing in the furnace.

Roasting in reverberatories is much too expensive in first cost of furnaces and in labor; the stock of ore required is also larger than in the case of kiln-roasting.

ORE SMELTING.

This should unquestionably be done in shaft furnaces. The ore, containing about 18 per cent. of silica and a little clay, mixed with the dressed ore, and roasted to about 7 or 8 per cent. sulphur, will make a matte containing 25 to 28 per cent. copper. The great bugbear of copper smelters—salamanders in the hearth—may be entirely avoided by working the furnaces on the principle of the German *Brillen Ofen*, with inclined soles.

Five water-jacketed shaft furnaces, each of 15 tons daily capacity, will be required. Two of these will be in repairs while three are in blast. These furnaces will cost about $3,000 each.

Matte roasting is effected in rectangular stalls, arched over, the dimensions being about 16 feet wide, 7 feet high to the bottom of the arch, and 24 feet long. The matte is piled to the depth of 4 feet on the floor, and very little wood is necessary. The roasting will be effected in four fires, and each stall will contain from 90,000 to 100,000 lb. of matte. The operation lasts in all 36 days, viz. first fire, 12 days; second fire, 10 days; third fire, 8 days; fourth fire, 6 days. Roasting, 30,000 lb. of matte, the product of 45 tons of ore, per day, will therefore, require 12 stalls, which, when made with fire-proof rock, will cost about $375 each.

MATTE SMELTING should also be done in water-jacketed shaft furnaces. The product of this operation will be black copper, yielding 95 per cent. copper, and rich matte, yielding 50 per cent. copper—about 40 per cent. of the former and 60 per cent. of the latter. Both products are charged into the blister furnace.

BLISTER SMELTING AND REFINING.—These operations can be conducted in the reverberatories now built, three of which will be required; the charge of these is 3,000 lb., and they would treat two charges a day. It will eventually be more advantageous to use large furnaces working charges of 15,000 lb., for in that case one furnace superintendent can oversee the entire production.

TO BE CONTINUED.

A SENSITIVE NEW BAROMETER has been brought before the Physical Society of St. Petersburg by M. Gontkowski. In this apparatus a mercury column of invariable height equilibrates almost the whole of the atmospheric pressure, and a column of petroleum oil completes the barometric column. The barometer has at its upper end an enlargement, in which is fixed, with a plug, another tube 1.40m. in length. The two ends of this latter tube have been closed at the lamp, but a lateral slit is made in the part introduced into the enlargement of the first tube. This slit is covered with bladder skin, previously treated with benzine, and coated with a solution of gelatine in glycerine; it is firmly attached about the tube by its two edges. Thus the bladder forms a partition, at once flexible and impermeable, between the mercury filling the first tube and its enlargement as far as the plug and the petroleum of the second. Experiments have shown that the resistance of this partition to flexure produces a loss of pressure less than 1-60th m. of mercury. The petroleum is 15 times lighter than mercury, and does not emit vapor of appreciable tension at the ordinary temperature.—*Eng. Mech.*

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* Extracts from a *Report* by R. P. Rothwell, Mining Engineer.

† *Transactions of the American Institute of Mining Engineers*, vol. ii.

MINING NEWS.

Staff Correspondence of the Engineering and Mining Journal.

FROM ALL PARTS OF THE WEST.

During the last fiscal month the California mill crushed 9,524 tons of ore, being an average of over 5 tons per day to each head.

Placer Claim, No. 2, Deadwood Gulch, Black Hills, cleared up 320 ounces of gold the other day from a week's run. The dust sold for $18 per ounce.

The furnaces of the Martin White Co., at Ward District (Nevada), are producing about $10,000 weekly in lead and silver each.

The De Frees Mine has levied an assessment of 25 cents, and the Rye Patch has declared a dividend of an equal amount. Both in Nevada.

The White Pine *News* says: "We are informed that a splendid development was made in the Stafford Mine, on Treasure Hill, last week. At the depth of 100 feet a 30-foot body of ore was struck, going from $150 to $700 per ton. The owners of the mines are Tim Shine, Sam Paul, and Johnny Flynn. They have commenced shipping ore to the mill of the English Company at Eberhardt. The boys have stuck to it a long time, and are well deserving of the success whichthey are meeting with. Hope it may turn out a regular bonanza."

The Belmont *Courier* says "the prospect is most encouraging. In the El Dorado South work is progressing finely, and the management are pushing things ahead at a lively rate. In the Belmont some pretty rich rock has been struck, and the chances are favorable for the opening out of a fine body before a great while. At Spanish Belt the joint tunnel is being pushed along as fast as possible. In Jefferson and Jett Districts the prospects are also very favorable. The day is not far distant when considerable bullion will be shipped from the mines in and around that section."

San Francisco capitalists, which is another name for Stock Board speculators, are paying great attention just at present to Arizona mines. The latest to excite interest is the Picacho. It is undergoing a thorough examination.

The Silver King mill started on the 13th ult., and is running finely. The ore being milled is exceedingly rich stuff.

A controlling interest in the Helena (Montana) smelting works has been purchased by some Eastern capitalists, and there is a prospect of the establishment being reopened. We sincerely hope this will be done, and this time under competent management.

Recently a vein of coal of considerable thickness and fair quality was opened along Lost Creek, a small stream which puts into the Deer Lodge Valley a little way above the town of Deer Lodge, Montana. Two levels have been opened, an dan attempt will be made to introduce the coal, which is a good lignite, into use in the towns around the mine.

The Walker mill to be erected to treat the ores of the Rainbow Mine at Butte, Montana, arrived at that flourishing town on the 13th ult., and is now being put up. The location selected is close by the mine.

The Butte *Miner* has the following notes from the placer claims of Moose Creek and Highland Gulch: "There are now upwards of sixty men in Moose Creek and Highland gulches, mostly engaged in mining, and the indications are looking favorable at present for quite an increase of population during the fall and next spring.

"The Peck Mine, Arizona, which was recently examined by Mr. Hague, is, according to his report, a five-foot vein, carrying a pay streak where opened from 1 to 15 inches in width. The ores consist of carbonate and sulphurets of lead, carrying chloride and sulphuret of silver. The mine is sunk 250 feet, and has produced 450 tons worth $225,000."

The following notes regarding the New Luke mill, built to work the ores of Bradshaw District, Arizona, is from the *Miner*:

"This mill was first brought to Arizona, regardless of cost, some eight years since, and put up near Tyson's Wells, in Yuma County, to work the ores from the Constancia Mine, but owing to the great amount of foreign metals contained in the quartz, it did not prove a paying investment, consequently was shut down and remained idle for several years, until Mr. Luke grasped the idea of purchasing it and removing it to its present site. The mill, as we have stated, was purchased in San Francisco regardless of cost, and is to-day, undoubtedly, as good, if not the best mill in the Territory. It consists of ten stamps, each weighing 650 pounds; two amalgamating pans, of the Horn pattern, weighing 3,500 pounds each; one settler, 8 feet in diameter; all of which is driven by a 40-horse double cut-off engine, perfect in every respect, and is, to-day, equally as good as when it came from the shop of the manufacturer. Attached to this complete ore-reducing establishment has also been erected an assay office, retort room, smelting furnace, and all the modern improvements attached to any quartz mill on the coast. A large supply of excellent water is one of the many advantages this mill possesses, besides being situated in a forest of oak, cedar, and pine timber, which are very essential elements with which to run a quartz mill.

"All of the above are requisite, but quartz is the feeder and forerunner of all this, and of it the proprietors have untold quantities. The mill will start up on Gretna ore, of which they have about 300 tons out, which will pay in the vicinity of $60 to the ton. The Gretna lead is two miles from the mill, and about two and a half feet wide; contains a great deal of good milling ore of low grade, say $40 to $50 to the ton.

"The Eclipse is two and a half miles from the mill, is over two feet wide, and contains a large amount of excellent milling ore which will pay well in both gold and silver. The Thurman is located about the same distance, and is equally good with the Eclipse, with the exception that the ore is principally gold. "The owners have placed this mill in the heart of timber and mineral, and to do this have undergone many hardships and humiliations, and deserve the praise of every honest, sincere heart in this community for the energy and pluck displayed. Our wish is that it will take more transportation to carry their bullion out than it did to put the machinery in."

FIG. 6.—WINNIE'S GROTTO.

A SIDE CANON (WALLS 2,000 FEET HIGH).—*See page 104.*

COLORADO.

The Georgetown *Courier*, of July 26th, one of the very best journals in the State, is brimful of interesting information regarding the mines of that vicinity. We clip and condense from its columns as follows:

The Owasco on Brown Mountain, after testing the patience and "grit" of its leasers for a long time, is at last in good pay.

A very considerable amount of ore is coming across the range at present from the Peru mines, notably by the Cashier and Tariff. The mineral now arriving in Georgetown at the rate of 100 jack loads per day, equal at least to 8 tons, is mainly the production of last winter.

As evidences of the genuine growth and progress of the San Juan country, no statements can be more forcible than actual bullion shipments. Those for the week ending July 16 amounted to $35,000, and consisted of $6,000 in gold from the Summit mines; 100,000 lb. of base bullion, worth $24,850, from Greene's smelting works at Silverton, two tons of crude ore worth $750, and $4,000 worth of roasted ore, from the establishment of Greene & Co.

A correspondent of the *Miner* (La Plata) from Cement Creek, reports much work going on in that gulch, and with good results. The Alpha, Helvetia, Columbia, Blue Jay, and some mammoth veins owned by Melville & Co., are the principal mines under work. The prospect of having smelting works in operation at the Forks of the Animas shortly is greatly encouraging to the mines of this district.

It is reported that the Little Grant gold mine, the first property of any note in San Juan, and the only genuine gold vein around Baker's Park, was sold a short time since for $3,000. The mine has been valued as high as $400,000, but was killed by bad management, etc. In time it will probably regain its former fame.

In Mount Sneffles District the recent developments are said to be something extraordinary, and especially in the Wheel of Fortune Mine, which is being developed with great rapidity and success. The Black Diamond and the Oriental are two other prominent mines of this camp. Both are yielding ore rich in ruby silver.

A contract for a 200-foot level on the Bill Yoony lode (an abominable name) has been let. The vein is a large one, and, it is thought, will pay from wall to wall, even at the present high rates for reduction and transportation.

The Ark lode in Burns Gulch, and the Nevada vein on Howard's Fork of the San Miguel, are looking very finely for what developments have been made. In the last-named cañon a number of promising discoveries have been made, and there is a prospect of another good district there.

The IXL tunnel is now 300 feet in length, and still going ahead vigorously. It is an important enterprise.

The Susquehanna tunnel is in 720 feet and pushing ahead with all rapidity possible. The drift and shaft upon the Victor lode, from this tunnel, are yielding about four tons daily.

The heavy machinery for the Melville Reduction Works, which was caught by the snow last fall on the eastern slope of the range, has at last arrived at Silverton, and will be immediately set up. When this establishment is in complete operation, San Juan will have four large reduction works, and will be in better shape for the treatment of its ores than any mining district of its age has ever been in Colorado.

Northern Mines.—Close by the town of Nederland is a belt of gold veins, wholly different in character from any others in Colorado. The principal mines are owned by the Weare Bros., of Kentucky, who have developed one, the First National, to a considerable extent, and have uncovered large bodies of good free quartz. A 20-stamp mill is built on the property. Lately a vein of splendid quartz 6 feet in width has been struck in the upper level, and the prospects for the owners is unusually good. The company owning the mines are opening them carefully and in good manner, and have already satisfied themselves, as well as all who have examined these lodes, that the property is among the best in the State. The JOURNAL will shortly have an illustration of the important mine of the group.

The five concentrating mills using the Frue Belt, located along the tellurium belt, are all doing well. Mr. Carrell has his mill coveniently and neatly arranged, and will receive his supply mainly from the Magnolia mines; the Crismon, Everett & Heberleine, and Douchett mills in Four Mile are together handling about 30 to 40 tons per day. In the first named a turbine is being put up to replace the engine for the summer. Mr. Heberleine is putting in a fifth table in his mill. The Phillips mill, at Salima (not using Frue Belts) is still idle.

The Washington Avenue Mine has been under a very careful system of development during the past two years, and has, in consequence, shown up so well that the company are about to buildreduction works, either on the amalgamation or leaching principle. The mine is opened by two shafts, each 300 feet deep and 500 feet apart. The two are connected by a pair of levels. A large and continuous body of ore is shown in these workings. The mineral is argentiferous galena and zinc-blende, and there can be no doubt of the great value of the

property. About 60 men are employed, and development still goes ahead rapidly. By the time the mill is built there will be ore enough in sight for a couple of years' run. If more mines were opened in this manner the country would be better off.

At the end of the adit level on the Santa La Saria Mine a very rich pocket of ore has lately been cut. Very little has been done on this mine during the past twelve months, but what has been done has shown well. The tunnel is thought to be from 20 to 50 feet away from the vein still. There are large amounts of ore in sight in the stopes of the Santa La Saria.

Southern Mines.—The discovery of unusually rich gold ores on Tyndall Hill, a short distance from Rosita, is creating much excitement. Considerable quartz, very rich in gold, has been found, and while the bulk of the ore produced from the principal discovery of the camp—the Maine—and from all the others is silver, it is hoped that a good gold district may result from the "find." A great number of lodes have been staked out, and at the foot of the hill placer claims have been taken up. From twenty-five to fifty men are now prospecting over the hill. Mill runs from the Maine have gone as high as 60 oz. silver and 10 oz. gold.

Mr. Mallett still continues his "brick" roasting, but, we understand, is also using his reverberatory to some extent, which, a short time ago it was thought advisable to tear down and abandon. He is receiving plenty of third class ore from the Pocahontas and Humboldt mines.

The Pocahontas has recently been selling portions of its old and abandoned dumps to mill men, and the superintendent has been astonished to find that that portion of the company's assets is of much greater value than was heretofore supposed. Mill runs average between $50 and $60 per ton.

A company has been organized to work the oil shales found in Oil Creek, south of Pike's Peak. Before Colorado was connected with the East by the Kansas Pacific, coal oil in considerable quantities was produced from this district. The industry will, no doubt, be easily and safely revived.

UTAH.

The Flagstaff Mining Company, in Utah, has purchased the claim of the South Star & Titus Company for $50,000.

Since the company succeeded in recovering the mine from Davis & Patrick, who were fraudulently holding it (according to the decree of the courts), the mine has paid very handsomely. In January, February, and March the produce amounted to 4 000 tons, sold for $102,000, yielding a profit of $63,000; but as Davis & Patrick left the mine with a floating indebtedness of $150,000 including the purchase of the claim above mentioned for $50,000, there is a call for more money, instead of a dividend.

We trust the Flagstaff will now be managed honestly, and repay those who have invested in it. Such a result would tend to show our English cousins that the fault is not in our mines, but in the managers they appoint to look after their interests here.

FIG. 7.—NORTHERN SLOPE OF THE UINTA MOUNTAINS, SHOWING RED CANON AND HOG-BACKS, WITH INTERVENING VALLEYS.—*See page* 104.

THE ARIZONA CHIEF MINING COMPANY.

TO THE EDITOR: SIR—In your issue of the 21st ult., we notice a card from Prof. Silliman, in which he says:

"By the prospectus of the 'Arizona Chief Gold and Silver Mining Company, of New York,' very recently placed in my hands, I find to my surprise my description of the 'Moss Lode,' as I saw it in 1864, cited in furtherance of this scheme. These citations are made from a paper of mine published in 1866, in the *American Journal of Science*, entitled 'On Some of the Mining Districts of Arizona, near the Rio Colorado, with Remarks on the Climate,' etc., etc. This paper was simply a statement of facts of my own observation respecting the geology, mineralogy, metallurgy, and climate of the regions I visited, and among other noteworthy things I described in some detail the 'Moss Lode,' one of the most remarkable outcrops of a fissure vein yet observed on this Continent, and visible even from the Colorado River, coursing east and west as a distinct sharply defined crest for at least three miles. A fragment of this paper, with important omissions, is now used to promote the sale of the 'Arizona Chief,' of which my first knowledge is the statement in this prospectus that it is a claim on the Moss Lode.

"I protest against this unauthorized use of my statements of observations made thirteen years since, and now presumably cited as a mining report.

"Explorations made on the Moss Lode subsequently to my knowledge of the vein failed, as I am informed, in developing a valuable mine, a fact not mentioned in the prospectus of the 'Arizona Chief.'"

When we made the extracts referred to from a public document, we certainly had no intention or desire to do Prof. Silliman an injustice, nor do we now think the omissions, which were made solely to curtail the length of our prospectus, have changed the general conclusions that would be gained by a perusal of his Report entire—a report which we certainly consider as being remarkably able and interesting. In the prospectus of the Arizona Chief Mining Company we stated that "Prof. Silliman's full report on the Geology and Mineralogy of this entire region can be seen at this office."

Since, however, the Professor *has* thus taken exceptions to our extracts, we gladly publish in full so much of his report as in any way relates to the Moss Lode, inclosing in brackets those portions which we used in our prospectus.

With regard to Prof. Silliman's statement, on information, that explorations subsequent to his examination "have failed in developing a valuable mine" on this vein, we beg to say we have in our possession no information that is unfavorable to the prospects of the property, and we invite Prof. Silliman, or any one else having facts detrimental to the property of this company, or more generally of the Moss vein, to publish the same in the ENGINEERING AND MINING JOURNAL. We court for our property the most rigid investigation, and are desirous that no fact, whether detrimental or otherwise, may be concealed. If we and the able experts, some of whose very favorable reports we have already published, have been deceived, we shall be pleased to know it now. We have made thorough investigations with regard to this property, and are satisfied that it is very valuable, and we think that a perusal of our various reports, which are always open for inspection at our office, will warrant this opinion.

Yours, etc.,

JAMES HITCHENS,
Superintendent and Director Arizona Chief G. & S. M. Co.,
Office 90 Broadway, New York.

PROF. SILLIMAN'S REPORT ON SOME OF THE MINING DISTRICTS OF ARIZONA NEAR THE RIO COLORADO.*

SAN FRANCISCO DISTRICT.

Situation and Approach.—The San Francisco Mining District is located upon the eastern side of the Colorado River, Allen's Camp, about the center of the district, being stated as 11½ miles from Fort Mojave. Allen's Camp is situated upon Silver Creek so called, a dry arroya which divides the San Francisco District into two nearly equal parts. Measured upon the course of the river, this district extends about twenty miles, or ten on each side of Silver Creek, from north to south. In the other direction, from east to west, the district extends about ten miles, the eastern limit being the first range of mountains, of which the most conspicuous point is known as Boundary Peak.

General Features and Outcroppings of the Mineral Veins.—The observer is struck, upon entering this district, with the singularly wild and fantastic outline of its bounding mountains and intermediate ridges; he learns with surprise that the bold and serrated peaks stretching from east to west and rising now in delicate needles, and again prolonged in acute ridges, are the outcrops of gigantic quartz lodes, among which are seen conspicuously the Moss Lode on the north, the Skinner and Parsons on the south. The general aspect of these outcrops is different from that of those seen in any other portion of the Great American Desert that I have had the opportunity of examining. Whether from the influence of volcanic heat or of atmospheric causes, or, which is more probable, of both combined, the aspect of these great quartz ridges is more rugged than any others which we have observed. The general course of the lodes in this district is that of pretty strict parallelism to the east and west magnetic equator, the deviations from this course seldom exceeding 4° or 5° by the compass. This is true of by far the greater number of all the outcroppings in the district. There is another set of lodes, however, much less numerous than the first, whose general direction is northwest and southeast, or more exactly N. 20° W.: these lodes, if prolonged, must obviously intersect, at certain points, some of the east and west lodes. They differ not only in their course and direction, but essentially in their mineralogical constitution. The first series, the east and west, are quartz lodes, characterized by the presence of feldspar and fluorspar as the peculiar associate minerals; showing also rather rarely at surface metallic sulphurets and free gold. The second set of lodes may be called calcareous, being composed to a great extent of magnesian carbonate of lime or dolomite, flanked in some cases by quartz linings with polished walls, and as a general rule quite barren and unpromising in their outcrop. The Virginia, Olive Oatman, and Buffalo are conspicuous examples of the calcareous lodes. A third class of lodes is observed in the San Francisco District whose main direction is northeast and southwest. This class is very small, not including more than three or four, namely: the Pride of Mexico, Triumvirate, Wright, and Morning Star.

Resources in Timber and Water.—San Francisco District, like all the neighboring regions of the Colorado, is entirely destitute of timber, and at present is very imperfectly supplied with water. Timber is said, however, to exist in considerable abundance, cotton-wood, cedar, pitch-pine, and nut-pine, on or near the banks of the Colorado, within 100 miles of Silver Creek; at points from which it can be brought at a moderate cost for the supply of fuel and mining timber to meet the future demands of this district.

When we remember the experience in Nevada, especially the dearth of water on Mt. Davidson, in the early history of mining on the Comstock lode, in Virginia City, and its present comparative abundance there as the result of mining operations, we are encouraged to believe that a similar result may be expected in San Francisco District, especially since the very limited explorations which have been carried out here have resulted in the discovery of water even in the driest situations.

This region is liable, like all the adjacent semi-desert districts, to sudden and violent storms of rain and wind, which may, as we had occasion to observe during our residence at Silver Creek, in a single hour, convert the dry arroya

* Extracts from a paper published in the *American Journal of Science and Arts*, vol. xli., May, 1866.

into a broad and roaring torrent, sweeping everything before it; while a few hours after scarce a trace of the inundation remains beyond the sand bars and pools of slime which a few days' sun reduces again to the condition of dust. Wells sunk along the line of these dry water courses find an abundant supply of water at a few feet from the surface, which, although hard, becomes reasonably good if constantly used.

Saline or Alkali Incrustations.—Like all other regions of the Great American Desert the surface of this district is abundantly charged with saline substances familiarly known as "alkali:" salts derived from the decomposition of the alkali minerals of the porphyritic and volcanic rocks which characterize the region. It is the solution of these substances in the drainage waters which gives most of the springs in this section those deleterious properties known as alkalinity. It is to be observed that the water which will flow from tunnels and shafts, excavated here in the processes of mining, will possess little or none of the qualities belonging to the surface waters, which dissolve away from every rain-fall the soluble saline matters that capillarity, aided by the powerful evaporation of a semi-tropical sun, concentrates upon the surface of the earth. This evil of bad water may therefore be expected to disappear with the active prosecution of mining enterprises.

Climate and Healthfulness.—Under a previous head the climate of the Colorado has been characterized. The San Francisco District, being elevated some 1,500 feet above the river, is less fervid during the hot months, the temperature averaging about ten degrees less than at Fort Mojave. The months of June, July, and August, are, however, extremely hot, and all active work in the open air, unless in the early morning or at evening, is interdicted, the temperature ranging in the neighborhood of 100° F. The air is extremely dry, 30° to 40° at times marking the difference between the wet and dry bulb thermometer. This circumstance favors exertion by lowering the temperature of the human body. Deep mining will, however, offer a refuge from the tropical summer heats, rendering labor agreeable, and supplying also water of a lower temperature and better quality than can be found at the surface.

[In point of healthfulness no region can be more free from diseases than this. I ascertained by inquiry from the physician at the military post that there were literally no climatic diseases known on that portion of the Colorado. Malaria is unknown, and fevers equally so;] chronic diarrhea occurs rarely, and then is traceable to causes independent of climate. This healthfulness may be considered as nature's compensation for some of the privations incident to this fervid region. The effect upon the urinary organs, due to the use of the saline waters of the desert, disappears immediately upon the use of the river water or any other pure water, and is always under the control of vegetable acids and of moderate doses of alcoholic stimulants.

General Features of the Geology of the District and Successive Epochs of Eruptive Rocks.—The rocks of this district are exclusively porphyritic or volcanic. The porphyry consists for the most part of the feldspathic variety, the crystals of feldspar being implanted in a violet or lavender-colored paste of various shades. Like most of the porphyries observed in the great American Desert, for example at Virginia City and at Esmeralda, at Bodie and in the Mojave Desert, these rocks yield to atmospheric influences, either crumbling into incoherent masses or breaking away into acute and fantastic cliffs. The porphyries in the San Francisco District are of at least two distinct epochs. Along the right-hand branch of the arroya of Silver Creek for the distance of a mile or more occurs an olive-green, sometimes leek-green porphyry, in which are imbedded—like boulders in a conglomerate—large masses or fragments of the violet-colored porphyry and of other associated plutonic rocks; for example, masses of basalt and diorite. This fact leads us to the conviction that the greenish porphyries are of more recent age than the violet-colored ones whose fragments they contain; fragments identical in character with the violet-colored porphyries which constitute the main mountain masses of the district. As the quartz lodes of this region—for example those gigantic dikes known as the Moss and Skinner lodes—contain imbedded in their mass, especially at their surface, fragments of scoriaceous lava, and present in general a burned and roasted appearance, I am led to the conclusion that, not long subsequent to the time of their separation from the masses of porphyry through which they cut, there was a general and violent volcanic action resulting in the upheaval or injection of many dikes of basalt, diorite, and olive-green porphyry, imbedding fragments torn from the older rocks as already described. That this period of activity was general and simultaneous for this region, seems almost certain from the fact of the parallelism of the east and west lodes, as well as from their mineralogical and metallurgical identity, so far as present observation and exploration justify an opinion.

A second period of eruption appears to be clearly indicated by the existence of the second class of lodes already noticed, namely, the calcareous lodes, whose main course is northwest and southeast, and the mineral constituents of which are entirely unlike those of the east and west lodes. There is evidence also in this district, as well as in the country at large, of volcanic eruptions of a much more recent date than those which have given origin to the mineral lodes. This evidence is seen in the cappings of basaltic lava which surmount many of the hills with plane tables, or which occur in parallel bands, interstratified with masses of volcanic tufa, sometimes of enormous thickness. We have no data for fixing the epoch of this third class of volcanic phenomena, but it seems clear that like the two others it was sub-oceanic; and in this respect all three are distinctly separated from a fourth and extremely well-marked group of similar phenomena which were plainly sub-aerial, and which occurred, geologically speaking, at a very late period, after the surface topography had assumed its present features. To this fourth class of volcanic phenomena we refer those extinct cones, so conspicuous just east of the Organ Cañon of the Mojave—cones whose lava streams now stretch their rugged course in long and regular inclined planes to a distance of eight or ten miles from the craters, standing with vertical basaltic walls ten or twenty feet above the plain, capped with scoria whose surface still speaks of the sluggish nature of the once molten mass.

Characteristics of the Mineral Veins.—The first thing which arrests the attention of the mineralogical observer in the San Francisco lodes, as compared with those of most other regions, is the general absence of the metallic sulphurets, and of the carious or porous character so common in the outcroppings of quartz in most auriferous regions. In this respect the San Francisco outcroppings are not unlike those seen in some portions of Nevada. There is reason to believe, so far as our own observations have extended, that this character of the outcroppings of the quartz lodes in San Francisco District is common to most of the outcroppings in the porphyritic or plutonic rocks of other mining districts in Arizona; as in the districts of Eldorado Cañon and the Wauba Yuma. The larger lodes of the San Francisco District, such as the Moss and Skinner, are characterized also at surface by a cross structure at right angles to the general course of the lodes, breaking them up into a series of subdivisions or headers which include often large masses of the adjacent porphyry walls, or of other rocks more or less distinctly volcanic. Whether it is due to the volcanic action to which the surface of these lodes has been subjected, or to some other less probable cause, it is a fact that most of the lodes in this district show an absence of the fringe or lining of fluccan or clay material, generally found in softer rocks. The lodes of this district are in general glued fast to the adjacent walls of porphyry, but that this characteristic is only superficial seems probable from the fact that the Allen shaft, sunk upon the Moss lode, intersecting the line of its southerly or hanging wall, shows a distinctly marked fluccan or fringe, separating the vein from the adjacent porphyry at a few feet depth from the surface—although at the surface no such structure was visible. The surface of the quartz also, at this portion of the Moss lode, has the appearance of having been burned, looking like quartz containing pyrites which has been roasted in the fire and then quenched in water, leaving the surface deeply stained with red oxide of iron; this strain penetrating by numerous rifts and fissures to a considerable depth from the surface. It was in quartz of this description that the extremely rich samplings of gold were taken which have rendered this lode famous. In similar quartz from this portion of the Moss lode I found it still easy to obtain rich specimens. The inference is that the surface of these lodes has been subject to the action of heat, probably through hot waters, dissolving or decomposing the metallic sulphurets, and leaving the superficial portion of the lodes in a hardened and changed condition, unpromising for metallic value, but giving place in depth to vein stuff of a softer character, and more charged with metallic sulphurets. This change is very conspicuous in the Techatticup lode in Eldorado cañon, which has been open to a depth of 140 feet, and shows, as I am informed by Henry Janin, a gradual increase to this depth of metallic sulphurets, from a condition at surface of a quartz lode destitute of these compounds. On the Moss lode a shaft of 52 feet has shown a similar change in the relative hardness of the including walls of porphyry, and the gradual softening of the contents of the vein. As yet the explorations in the San Francisco District are quite too limited in depth to enable us to apply this reasoning with certainty to any number of the lodes, and it is by analogy only that the conclusion is reached which seems to warrant this probability.

Mineral Contents of the Lodes.—The Moss, Skinner, and in general the larger lodes of the San Francisco District, are characterized by the presence of an abundance of white feldspar, forming sometimes the mass of the vein; the quartz existing then as a subordinate vein in the feldspathic and porphyritic gangue.

The mineral most characteristic of the east and west lodes in the San Francisco District, next to the quartz and feldspar which form the great mass of the lodes, is *fluorspar*, a mineral frequently seen elsewhere in the world as an associate in silver-bearing lodes—as, for example, in Freiberg, in Saxony—but which is of rare occurrence in this country in a similar association. This mineral is found abundantly in the Skinner lode, the Dayton, the Knickerbocker, and the Quackenbush; and has been observed also in the Moss and several others. It is associated in them with free gold, horn silver sometimes in distinct dodecahedral crystals, and iron gossan.

Description of some of the Veins of the San Francisco District.—In general the lodes in San Francisco District are remarkably vertical, rarely deviating more than 30° from the perpendicular; and their outcroppings are commonly very strong and well marked, forming, in the case of the larger lodes, conspicuous features in the topography of the country- landmarks seen for many miles.

To describe all the lodes in this district would be tedious and unprofitable. The amount of work performed on them has in general been no more than is essential to conform to the easy conditions imposed by the laws of the district upon claimants; and has in most cases been too little to furnish important data for the guidance of the judgment. I shall therefore confine myself to those which are best developed or of the most general interest and importance, commencing with the Moss lode, which has received more attention than any other one of the San Francisco lodes.

[*Of the Moss Lode.*—The outcroppings of the Moss lode form a most conspicuous feature in the landscape, being seen, standing up in bold crests and pinnacles, from a long distance. The observer who enters the Colorado Valley from the Mojave Desert has his attention arrested by the crests of the Moss lode, as soon as he emerges from the valley of Pah-Utah Creek, at a distance of at least twenty miles in an air line. This lode stretches in a continuous line for at least 7,800 feet, and is "claimed" for double that distance. Its distance north of Silver Creek is about two miles, and its course is about W. 5° N., or nearly at right angles to the river, from which it is distant about five miles. This vein shows at surface about fifty feet of thickness, as well as can be judged in its present state of development, while its croppings rise to a height of from fifty to one hundred feet or more above the arroya or wash, sinking at times to the surface and then towering away again in bold peaks and crests. Its height above the Colorado must be at least 1,500 feet. Its dip is southerly 65° to 70°, or 15° to 25° away from the vertical. The weathered aspect of this vein is reddish and rich brown, but on breaking away the weathered surfaces it is found to be composed of whitish compact feldspar and quartzose porphyry, intersected by veins of very red, often marbled quartz, at times violet-colored and rich in free gold.] There are included in this vast mass, not merely numerous sets of feldspar, hornstone, and quartz veins, but also masses of gray porphyry and lumps of tufaceous and vesicular lava, indicating the action of heat, either of thermal waters or of direct volcanic agency. Some masses of a cellular structure have the vesicles filled with hyaline quartz or hyalite—possibly also with some zeolite—and these masses so resemble the siliceous sinter of Steamboat springs in Washoe valley, as to recall at once the probability of a thermal origin. This probability is further strengthened by the occurrence of veined and marbled jaspers and hornstones. Drusy surfaces of crystalline quartz are also seen abundantly in all the "shuts" or closures of the vein.

[The hanging-wall of the Moss lode is an ash-gray feldspathic porphyry, often intersected by thread veins of quartz and hornstone, but barren of metallic sulphurets, and showing at the surface no clay wall or fluccan, separating it from the vein. The absence of this character of permanent and well defined lodes at the surface of the Moss ledge is in analogy with the character of many veins in Nevada, which, however, at moderate depths acquire this feature, as the Allen shaft shows to be the fact for the south or hanging wall of the Moss lode. The entire outcrop on the Moss lode has a burnt up, dried, and hardened aspect, as previously explained; and this character is shown now by very moderate explorations to be quite superficial.]

The characteristic veinstone of the Moss lode is feldspar with veins of chert or hornstone, in which matrix occur veins of highly ferruginous quartz, sometimes almost an iron jasper of various colors, sometimes compact and again cellular. The surfaces of closure are drusy, not separated from the gangue by any parting, but cutting it with a dip usually more highly inclined than the dip of the vein itself. These intercalated or subordinate veins of quartz appear to maintain a course quite parallel with the main vein. Too little work has however been done on the lode to justify this generalization in any more than a limited sense, as far as can at present be seen.

[The rich specimens of free gold in quartz, of which over a ton weight were

taken at one time in 1864, were obtained on one of these subordinate veins of deep red iron-stained quartz, just behind the point on the so called San Francisco claim where Allen's shaft is now being sunk. I caused some blasts to be put in at this point, and was able to obtain a considerable amount of quartz of similar character, highly charged with gold. That the gold is not confined to this point I found by breaking some specimens at several points along the face of the outcrop] for a distance of 250 feet ; and it is easy to detect minute particles of the precious metal along a line of 500 feet by careful observation.

[The Moss lode has been opened by a shaft called Allen's shaft, sunk on the San Francisco claim, ten or twelve feet in front of the spot where the first lot of rich ore was obtained, to a depth, in August, 1864, of 42 feet. This shaft was set to cut the hanging wall of the lode and pass through its entire thickness in an estimated depth of about 100 feet. Where it cut the southern edge of the lode ore was found from which an assay was obtained, showing $4,200 per ton of precious metals.

I ordered this shaft cleaned up, to exhibit the nature of the section it has furnished of this side of the lode. The result was interesting : the "pay streak" or productive ore ground is seen to be here about three feet wide in two nearly equal divisions, separated by about one foot of soft yellowish and reddish material, which prospects well for gold. This softer seam has come in on sinking, and is not seen at all at surface. It is increasing in width as the shaft descends, and is easily worked by the pick alone. Its dip is such that it passes out of the shaft in twenty-seven feet, the shaft being eight feet wide. The hanging wall is perfectly definite and shows smooth "slickensides," with a clay lining between them in places from three to four inches in thickness. The upper rock is a reddish feldspathic porphyry, with thread veins of quartz. The vein stuff shows very little sulphurets and the porphyry comes in between the walls. The quartzose ground increases as the shaft descends, until at its present bottom it is nearly all quartz.

The bullion obtained from this vein contains silver enough to give it a pale yellow color. The gold appears in beautiful polished scales, the flat surfaces often embossed with crystalline lines. The precious metal is sometimes imbedded in a compact red jaspery quartz, presenting, when cut and polished, beautiful graphic goldstone. This rich gold-bearing mass of ferruginous quartz it will be understood formed the outcrop of this gigantic vein at only isolated points. Subsequently having an opportunity of comparing the physical features of the Moss vein with the surface show upon the "Comstock lode" in Nevada, I was forcibly struck with the great resemblance of these portions of the Moss vein with that portion of the Comstock which is still seen at Gold Hill, south of Virginia City, where similar rich deposits of low grade gold in the quartz outcrop gave its name to the town, which has since sprung into such wonderful activity as the result of the development of the mines which have been opened upon this remarkable silver vein. The inference seems probable that the explorations of the Moss lode will likewise develop a silver mine, and if the magnitude of the outcroppings afford any just ground of comparison, the future of the Moss lode should not suffer in the contrast. But there is this important feature of difference, the rich sulphids associated with native silver which were found in such remarkable abundance in that part of the Comstock, now known as the Ophir ground, has never been seen on the Moss lode.]

LAKE SUPERIOR IRON NOTES.

Menominee Range Mines.—The railway is now about completed to the Breen Mine, which is ready to ship ore at once. The Breitung Mine is also ready to take out ore. Both of these mines have a large quantity of ore uncovered ready to quarry, and they are developing very favorably. The Eagle Mine, near Fisher Lake, Wisconsin, is said to have a bed of blue hematite over 100 feet thick. The ore is said to assay 56 per cent. iron and to be remarkably free from phosphorus.

Quartz Mining.—The Marquette *Journal* says : The shipment of quartz from this port has grown to be a business of no little importance. It is expected that the sales this year will reach five or six thousand tons. This quartz is used, after being ground fine, for lining Bessemer steel converters, and the sales thus far have been principally confined to the Chicago and St. Louis markets.

Electric Mine Signals.—The Jackson Iron Mine, L. S., we learn from the Marquette Mining *Journal*, is the first to introduce the system of electric signals, which it has done at their mines at Negaunee. Wires are laid from the engine house connecting the main or large battery with the smaller ones located in the different pits and openings By means of an instrument, instantaneous communication can be had with the engine house announcing blasts about to occur at any part of the mine. The message not only announces a blast, but gives the number or name of the pit where it is to take place.

Freights on L. S. Iron Ore.—L'Anse to Cleveland and Ashtabula, $1.20@$1.25 ; Marquette to Cleveland and Ashtabula, $1.25 ; Escanaba to Cleveland and Ashtabula, 70c.

Iron Ore and Iron Shipments for Marquette.—From the same paper we take the following report of the shipments from the port of Marquette for the season, up to and including Wednesday, August 1 :

IRON ORE AND QUARTZ.

Name of Mine.	*Gross Tons.*	*Name of Mine.*	*Gross Tons.*
Republic	93,367	Cleveland	64,327
Lake Superior	58,843	Edwards	5,418
Rolling Mill	7,447	Humboldt	9,661
New York	1,749	Champion	37,675
McComber	2,254	Carp River Quartz	671
R. P. Traverse Quartz	957		
		Total	282,369

PIG IRON.

Name of Furnace.	*Gross Tons.*	*Name of Furnace.*	*Gross Tons.*
Pioneer	967	Carp River	956
Rolling Mill	4,583		
Morgan	201	Total	6,707

Escanaba.—The following table shows the ore shipments from Escanaba up to and including Wednesday, August 1 :

Jackson	34,289	South Jackson	4,701
New York	29,784	Cleveland	4,198
Angeline (hard)	10,445	Angeline (hematite)	1,422
Barnum	20,025	Saginaw	41,459
Salisbury	17,343	Palmer	5,403
Michigamme	3,164	Lake Superior (hard)	6,764
Lake Superior (hematite)	405	Rolling Mill	7,954
McComber	3,250	Winthrop	8,601
Mitchell	1,653	Cambria	7,936
Goodrich	503	Shenango	90
Bessemer	3,561	Smith	1,987
New York (hematite)	989		
		Total	215,931

The following shows the total shipments of ore from the district for the season, together with those of a corresponding period last year ;

FROM WHERE.	1876.	FROM WHERE.	1877.
From Marquette	218,411	From Marquette	282,369
From Escanaba	158,843	From Escanaba	215,931
From L'Anse	32,234	From L'Anse	41,896
Total	409,493	Total	540,196

Showing an increase of 140,703 gross tons.

L'Anse.—The following table exhibits the shipments from the port of L'Anse for the season, up to and including Wednesday, August 1 :

Name of Mine.	*Gross Tons.*	*Name of Mine.*	*Gross Tons.*
Michigamme	20,013	Keystone	9,608
Spurr	11,858		
Stewart	417	Total	41,896

ON THE RECOVERY OF SULPHUR FROM GYPSUM AND SULPHATE OF SODA IN THE MANUFACTURE OF GLASS.

By Dr. O. Schott.

After pointing out the desirability of saving the sulphur present in the sulphate of sodium used in the manufacture of glass, the author directs attention to an equation which he had previously given for the reaction between sulphate of sodium, carbon, and silica:

$$2Na_2SO_4 + C + 2SiO_2 = 2Na_2SiO_3 + 2SO_2 + CO_2$$

The practical difficulty of the method of recovering the sulphurous acid indicated by this reaction has been such as to prevent the attempt; for even if the melted silicate of sodium could be prevented from attacking the walls of the furnace, the cost of fuel, etc., would be such as to outweigh the value of the recovered sulphur. Convinced that the recovery of sulphur from sulphate of sodium alone is not sufficiently remunerative, the author endeavors to remedy this defect in glass manufacture by using, instead of silicate of sodium, a silicate of sodium and calcium got by heating a mixture of sulphate of sodium, gypsum, carbon, and silica. By the introduction of lime, as gypsum, with excess of carbon the author has easily succeeded in melting the sulphate of calcium into glass. In order that the expulsion of the sulphur should be complete it is not necessary that both silicates should be wholly fused. The incompleteness of the fusion, as well as the presence of the silicate of calcium, tends greatly to prevent the walls of the containing vessel from being attacked, as they would be by silicate of sodium alone.

The author proceeds to show that the amount of gas developed is more than sufficient to insure homogeneity. Out of a charge weighing 8,058 lbs. the weight of sulphurous and carbonic acid gases given off is 1,861 lb., giving a volume (at 32° F. and 29 92 inches of pressure) of 12,855 cubic feet, and this at the temperature of the furnace will be increased to about 35,300 cubic feet, which is greatly in excess of what is required to prevent streakiness. To avoid this danger care must be taken either to leave enough gas in the crude glass during the interruption of the operation, or to add to the crude glass (if wholly free of gas) a small quantity of the crude material of charge.

In the author's experiments the gas given off consisted of 2 volumes of sulphurous acid and 1 volume of carbonic acid. If the presence of the carbonic acid is found to interfere with the action of the gases in the leaden chambers, a sulphide may be used in place of carbon as a reducing agent, when sulphurous acid alone will be given off. The mischief done by sulphurous acid gas in the neighborhood of a glass-work is such as to make the saving of the sulphurous acid highly advantageous to the district as well as profitable to the proprietor. The price of the gypsum need not amount to much more than that of the chalk or lime now used. The expense of the recovery of sulphur, in fuel and labor, will be more than covered by the value of the sulphurous acid. Although the process had not yet been fully tried, the author believes that it possesses the following advantages; the absence of free alkali will increase the safety of the crucibles, the time of melting will be shortened, and the damage to the alkali will be reduced to a minimum.—(*Dingler's Polytechnisches Journal*, vol. ccxxi., p. 142.)—*Proceedings of the Institution of Civil Engineers.*

NOTES.

A PRESSURE of 40 to 120 atmospheres has been found by Quincke to be incapable of forcing a perceptible quantity of carbonic acid or hydrogen gas through a glass wall 1·5 millimeter in thickness, during a period of fifteen years.

END OF THE BRAIDWOOD (ILL.) STRIKE.—The miners who have been on strike at this place since April last, surrendered last week and went to work, and allowed the negroes, who have been employed since the strike commenced, to go to work also.

THE PLATTEVILLE (WIS.) LEAD OUTPUT.—A mining company at Platteville, Wis., have taken out 70,000 pounds of lead ore this summer, and have about 50,000 pounds in sight, with good indications that the largest part of the lode has not been reached.

SPANISH DUTY ON COAL.—Coal and coke will pay, on their entry into Spain, a fiscal duty of 2s. (2 pesetas 50 centimos) per ton. A petition has been made by the gas companies asking that coal introduced for the purpose of gas or coke making be exempted from duty.

DEEP BORING AT ST. LOUIS, MO.—In boring the artesian well at the Insane Asylum, St. Louis, the auger penetrated 3,800 feet, going through 200 feet of coal measures, 500 feet of sub-carboniferous limestones, 1,000 feet of Devonian and 2,000 feet of upper and lower silurian, and in the bottom cut a brown ferruginous sandstone, supposed to be of Potsdam age.

MINING INSPECTORS APPOINTED IN PENNSYLVANIA.—Gov. Hartranft has appointed J. J. Davis, of Armstrong, Wm. Richards, of Tioga, and Wm. Wilcox, of Allegheny, mining inspectors for the bituminous coal fields of the State. There was a warm and protracted contest for the positions among sixteen applicants who had passed a successful examination.

A LARGE order has been received by a mica concern in this city for plates of mica to go to China. The Chinese use these plates, which are about seven inches square, for idolatrous purposes. They paint upon them the likenesses of their divinities, and reverently adore the same. These particular ones are to be used for household decoration and devotion. They are considered quite stylish among the better class of Chinese.

SCHUYLKILL WAGES FOR JULY, 1877.—The following collieries, drawn to furnish prices of coal sold in June, 1877, to fix rate of wages to be paid in July, 1877, report the following as the average of their sales: St. Nicholas Colliery, $1.55; Indian Ridge Colliery, $1.56; Knickerbocker Colliery, $1.35; Glendower Colliery, $1.10; North Mahogany Colliery, $1.40. The average of these prices being $1.39, the rate of wages to be paid in July, 1877, is 37 per cent. below the $2.50 basis.

DR. C. A. BRESSA, deceased in 1835, bequeathed all his property to the Turin Academy of Sciences, the net interest to be given every two years as a prize for the best work done, during the previous four years, in physics, natural history, chemistry, physiology, pathology, geology, history, geography, or statistics. The fund is now available, and the first award will be made two years hence. The competition will be open to the whole world, and the prize will amount to about $2,500.—*Popular Science Monthly.*

AN OIL PIPE LINE IN NEW YORK.—A pipe line, about three miles and a quarter long, intended to faciliate the transfer of petroleum from New York Central Railroad Co's. oil depot at Sixty-fifth street and North river, New York, to the refinery of the Staten Oil Company at Hunter's Point, on Long Island, is now being laid down. The object of this improvement is to save the cost of lighterage and to lessen the danger involved in the modes of local transportation that have hitherto been adopted.—*Railway World.*

ANTISEPTIC PROPERTIES OF BICHROMATE OF POTASSA.—Langeroy, in a communication to the Paris Academy of Sciences, calls attention to the antiseptic properties of bichromate of potash. According to him, 1 per cent. of the bichromate in water absolutely prevents putrefaction in all animal and vegetable substances. After meat has stood in the solution for a few months it resembles gutta percha, and medals have been struck from it; but it becomes poisonous, and even dogs refuse to eat it. This antiseptic will doubtless be of great use for the preservation of natural history specimens.—*Popular Science Monthly.*

OXIDES OF IRON.—M. H. Moisson.—If ferric oxide obtained by calcining oxalate of iron is heated to 350° C. in a current of pure hydrogen for thirty minutes, the result is a black magnetic powder, not pyrophoric, and having the composition of magnetic oxide. It is not a mixture of ferric oxide and magnetic iron. If ferric oxide is kept for twenty minutes in a current of pure dry hydrogen at 500°, we obtain a black powder duller than the former, magnetic, pyrophoric, and having the composition and properties of ferrous acid. At 500° it decomposes carbonic acid, and becomes transformed into magnetic oxide. If ferric oxide is reduced by hydrogen at 700°, we obtain metallic iron which is not pyrophoric. At 1,000° the pyrophoric ferrous oxide obtained at 440° loses its properties. There are, therefore, two allotropic ferrous oxides.—*Chemical News.*

NOVEL DREDGING MACHINE FOR AURIFEROUS MINING.—The California Mining and Dredging Company have in operation near Oroville a novel description of dredger, which is employed to raise from the river bottom the auriferous gravel. The machinery is placed on the deck of a flatboat or scow, eighty to one hundred feet in length and about thirty feet in width. The principal feature of the affair is a large iron cylinder, forty feet long and thirty inches in diameter, suspended from a derrick securely set in the scow. The cylinder is closed at the upper end by an iron head securely riveted on. Through this iron head two pipes are inserted, one leading from the steam boiler, and one from the water pump. The operation of the machine is as follows: The cylinder is lowered by a wire cable into the river, and allowed to sink until it touches bottom. As its weight is about three tons it always sinks quite a distance. As soon as the cylinder stops sinking steam is let on from the boiler into it, so as to expel the air, the pressure being fifteen pounds to the square inch. When the air is expelled and the cylinder full of steam, cold water is immediately let into the top of the cylinder. The water at once condenses the steam, and leaves a vacuum in the tube. As soon as the vacuum is formed atmospheric pressure asserts its power, and forces into the cylinder a mass of mud and gravel, weighing from four to seven tons, and sometimes filling up the pipe for ten or fifteen feet. The pipe is then hoisted by steam power, and its contents dumped into a string of sluice boxes alongside the scow. Water is furnished to these sluices by a Chinese pump worked by the engine that works the water pump.—*Foothill Tidings.*

A NEW THEORY OF THE SOLAR SPECTRUM.—*Important Scientific Discovery by Professor Henry Draper.*—At a meeting of the American Philosophical Society, held in this city, Friday July 20, Prof. Henry Draper, of New York, read a paper on his "Discovery of Oxygen in the Sun by Photography, and on a new theory of the Solar Spectrum." The coincidence of bright lines of bands in a photograph of the solar spectrum of air, was clearly shown by photographs accompanying the paper, and fully set forth in the text. It is not practicable to explain this in a newspaper report except by reproduction of the photographs themselves. Perhaps the following quotation from the paper of Professor Draper will give to scientific men a key to the nature of the discovery:

"*Oxygen discloses itself by bright lines or bands in the solar spectrum*, and does not give dark absorption lines like the metals. We must therefore change our theory of the solar spectrum, and no longer regard it merely as a continous spectrum with certain rays absorbed by a layer of ignited metallic vapors, but as having also bright lines and bands superposed on the background of continuous spectrum. Such a conception not only opens the way to the discovery of others of the non-metals, sulphur, phosphorus, selenium, chlorine, bromine, iodine, buorine, carbon, etc., but also may account for some of the so-called dark lines, by regarding them as intervals between bright lines.

"It must be distinctly understood that in speaking of the solar spectrum here, I do not mean the spectrum of any limited area upon the dist or margin of the sun, but the spectrum of light from the whole dist. I have not used an image of the sun upon the slit of the spectroscope, but have employed the beam reflected from the flat mirror of the heliostat without any condenser."

The discovery may be considered as three-fold: first, that there are bright lines or bands in the solar spectrum; second, that certain of these lines coincide exactly with the known oxygen lines in the spectrum of air produced by the electric spark; and third, that others of them probably coincide with the lines of the metalloids, or may be referable to unknown substances. Hitherto the presence of oxygen has not been discovered in the sun, although its existence might have been suspected there on purely theoretical considerations, based upon terrestrial chemistry, the nebular hypothesis, and the fact that that element makes up eight-ninths of the water of the globe, one-third of the crust of the earth, and one-fifth of the air.

Professor Barker, of the University of Pennsylvania, who was present, said that he regarded the discovery as the most important contribution to solar physics made in America, and the most important anywhere since the discoveries of Kirschoff.—*Polytechnic Review.*

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Denver Office:

HINTS TO CORRESPONDENTS.—Never send your letter of instruction inside the package of ore, or, if you do, pay letter postage. Otherwise you may be fined heavily by the Postal Department.

Remember that the object of this department is to give information about minerals and mines. We cannot undertake, however, to give elaborate opinions in regard to properties. A short time ago a correspondent calmly asked us to go up to Mt. Lincoln and advise him as to the condition of a mine in that district, in which he thought of investing. Probably he thought the mountain was around the corner or across the way, instead of being a good hundred miles into the range. We shall always be gratified to accommodate these inquiring friends, but must stipulate that it is to be on a different basis than the one on which this column is edited. We shall never grumble at ore samples and ordinary requests for information.

SAMPLES AND QUESTIONS.

125. WOODS, Caribou—The sample sent is an almost solid silver glance, and assays fairly well as you see below. The Young Cowtail Mine (rather curious name this) is an obscure and unnoticed piece of property in Jersey Gulch, about which at one time there was considerable excitement owing to the supposed discovery of leaf gold in its ore. It is of no value and is idle now.

And, by the way, why is it that so many miners delight in giving their discoveries such outlandish names as many of them do? It is true there is not much in a name outside of euphony, but that one consideration is a powerful one. Among the most outrageous and nonsensical are "Bull of the Woods," "You Bet," "Bully Boy," "Hunki-Dory," "Dead Beat," "Dead Broke," "Terrible," "Horrible" and "Cock Eye." And besides these there are scores of others equally outrageous. Let every miner, as he goes to christen his prospect hole, think of the possibility of its being thrown into a company some day and stocked at a million, and then consider how discouraging it would be to have to urge the Dead Broke stock on the New York Stock Board. Seriously, however, there is a well-founded prejudice against a mine with a distasteful name. Our natural instincts induce us to form an unfavorable impression of a man with an ill-sounding cognomen, and the same rule applies to inanimate things. A party looking for mines will in nine cases out of ten be sooner induced to visit the Great Republic, for instance, than the Bully Boy or the Wild Delirium. There is no lack of good names for mines. Let us have them.

126. B. F. GIBBONS, Darling, Montana.—Samples arrived too late for report in this issue. Will have a reply in the next.

127. E. F. A., Idaho Springs, Colorado.—Elegantly crystallized specimen of Tennantite from Freeland Mine, Trail Creek. Tennantite is essentially an arsenical sulphuret of copper of about the following composition: Copper, 40 to 50 per cent.; iron, 1 to 10 per cent.; sulphur, 25 to 30 per cent.; arsenic, 12 to 20 per cent.; traces of zinc, antimony, and lead. It generally carries some silver. The mineral is a comparatively rare one. We do not remember having seen any from any other district in the State. The little white tabular crystals interspersed on the sample are siderite or carbonate of iron. The pink tinge is due to a slight admixture of manganese. Put one of these crystals on a piece of charcoal and heat gently before the blowpipe. The mineral will rapidly turn black (to oxide of iron) and become magnetic.

128. GEORGE FORD, Boise, Idaho.—The sample corresponds in physical appearance and chemical reaction to olivenite, which it undoubtedly is, and a very handsome specimen also. Approximate composition: Oxide of copper, 53 per cent.; arsenious acid, 38 per cent.; phosphoric acid, 4 per cent.; water, 4 per cent. It is a good ore of copper, but you are not likely to find it in abundance. It will probably be found in depth to have altered to an oxide of copper. The high percentage of arsenic is against it. No indications of gold or silver.

129. JAMES T. FORD, Alma, Colorado.—We can find nothing but a fair quality of limestone in your sample. This is discouraging, of course. There are a few crystals of black mica in the rock.

130. LEXINGTON MINE, Helena, Montana.—Iron black massive mineral is Miargyrite. Composition as follows: Antimony, 39·14 per cent.; silver, 36·40 per cent.; sulphur, 21·95 per cent.; copper, 1·06 per cent.; trace of iron.

131. E. F. R., of Central, inquires what is meant by pyrites. Speaking accurately, this term covers but one mineral, viz. the bisulphide of iron, containing sulphur, 53 per cent., and iron, 47 per cent. It is a bright brass-yellow mineral, glistening and having a distinct metallic luster, crystallizes in cubes and variations on the cube. Without any notable change in appearance or chemical composition, it may contain gold, silver, tin, copper, cobalt, nickel, or thallium in slight quantities. In ordinary language, however, the term pyrites includes chalcopyrite, in which 35 per cent. of the sulphur and iron are replaced by copper; stannite, in which nearly all the iron is replaced by tin and copper; linnæite, carrying a heavy percentage of cobalt and nickel; cobaltite, containing a heavy percentage of cobalt and arsenic; marcasite, having almost the same composition as the true pyrite, but differing in crystallization; leucopyrite, arsenical pyrites, and mispickel, which is qualitatively the same as leucopyrite, but contains less arsenic. The true pyrite derives its name from the Greek word meaning "fire," because the mineral will emit sparks, if struck sharply on a steel edge. It would be well if miners posted themselves thoroughly on this important class of minerals. It is a large and very common family, and the varieties are abundant in gold and silver districts, but mainly in the former. As a general rule pyrites of all kinds carry some gold. In general the varieties containing copper are the richest, but there are important variations to this rule. The ability to distinguish between the minerals named above by their physical appearance will be found of great value to prospectors.

ASSAYS AND ANALYSES.

132. JUDGE WOODS, Caribou, Colorado.—Silver, 18,460 oz. per ton.

133. S. G. COLLINS, Denver.—Mineral water, crude sulphate of soda, and weed from Soda Lakes, Morrison, Colorado.

Water (evaporated), 391·81 grains of solid matter per pint. Solid matter as follows: Percentage of organic matter, 3·00; oxide of iron and alumina, 10·10; chlorine, 4·30; sulphuric acid, 41·00; lime, 5·20; magnesia, 4·00; soda, 32·20; total, 99·80 per cent.

Crude Sulphate of Soda (naturally dried).—Percentage of organic matter, 19·10; silica, 5·20; alumina and oxide of iron, 14·40; chlorine, 2·40; sulphuric acid, 25·80; lime, 8·80; magnesia, 3·90; soda, 19·10; total, 98·70 per cent.

Weed or Kelp.—Percentage of organic matter, 76·2; silica, ·8; alumina and oxide of iron, 2·30; chlorine, trace; sulphuric acid, 11·00; lime, 1·20; magnesia, trace; soda, 6·40; total, 97·90 per cent.

134. HUKILL MINE, Spanish Bar, Colo.—Second class ore—Silver, $107.46; gold, $14.47; copper, 11·86 per cent. Second class ore—Gold, $26.87; silver, $64.80; copper, 34·18 per cent. First class ore—Silver, $888.00; gold, $157.00; copper, 38 per cent. Concentrating ore—Sample from 1200-ton dump. Silver, $16.32; gold, $20.67; copper, 5·08 per cent.

135. J. J. JOSLIN, Denver.—Sample from Wyoming. Gold, none; silver, $3.60; copper, 19·77 per cent. The copper exists largely as native metal.

136. W. H. A., Rosita, Colo.—Gold, none; silver, $3.60.

STATISTICS OF COAL PRODUCTION.

This is the only Report published that gives full and accurate returns of the production of our Anthracite mines.

Comparative Statement for the week ending Aug. 4, and years from Jan 1st.

Tons of 2,240 lb.	1877.		1876.	
	Week.	Year.	Week.	Year.
Wyoming Region.				
D. & H. Canal Co.	2,033	1,283,899	44,941	1,016,012
D. L. & W. RR. Co.	5,641	1,306,199	45,366	799,247
Penn. Coal Co.	11,312	640,380	31,468	541,843
L. V. RR. Co.	1,036	575,117	19,585	520,191
P. & N. Y. RR. Co.	....	32,728	....	14,003
C. RR. of N. J.	†25,429	857,206	28,958	666,750
Penn. Canal Co.	320	216,810	10,903	190,532
	45,771	4,912,339	181,221	3,748,578
Lehigh Region.				
L. V. RR. Co.	28,603	1,710,876	30,622	1,340,847
C. RR. of N. J.	†29,936	871,853	25,959	659,310
D. H. & W. B. RR.	....	8,860	2,006	25,730
	58,539	2,591,589	58,587	2,025,887
Schuylkill Region.				
P. & R. RR. Co.	143,047	3,517,824	115,963	2,297,359
Shamokin & Lykens Val.	9,214	360,173	25,247	489,410
	152,261	3,877,997	141,210	2,786,769
Sullivan Region.				
Sul. & Erie RR. Co.	125	5,775	11	26,640
Total	256,696	11,387,700	381,029	8,587,874
Increase	....	2,799,826	....	....
Decrease	124,333	...	....	....

† For 9 days ending July 31.

The above table does not include the amount of coal consumed and sold at the mines, which is about five per cent of the whole production.

Receipts and shipments of coal at Chicago, Ill., for the week ending Aug. 4, and year from January 1:

	Week. Tons.	Year. Tons.
Receipts	54,918	893,078
Shipments	4,092	116,663

The shipments of coal at Cleveland, Ohio, for the week ending Aug. 4 were as follows: shipped coastwise, 5,349 tons; total for year, 135,254 tons; foreign shipments, 2,946 tons; total for year, 47,554. Total of coastwise and foreign shipments for week, 8,295; for year, 182,808.

The Exports of Coal from Baltimore for the week ending Aug. 3 were ——— tons, and since January 1st, 20,937 tons as against 18,365 tons for the corresponding time in 1876.

Receipts of Coal at Boston, for the week ending Aug. 3 and years from Jan. 1.

Tons of 2,240 lb.	1877.		1876.	
	Week.	Year.	Week.	Year.
From				
Alexandria and Georgetown	....	40,104	2,176	81,158
Philadelphia	12,368	349,297	19,185	604,712
Baltimore	1,080	78,351	3,766	136,822
Other places	5,322	167,309	7,593	280,775
Great Britain	...	1,353	...	4,722
Nova Scotia	2,627	14,498	1,395	22,166
Total	21,397	650,912	34,115	1,130,355

Perth Amboy business:

	Tons.
Received for the week	8,245
Shipped for the week	27,689
On hand Aug. 4	95,750

The decrease of shipments of Cumberland Coal over the Cumberland Branch, and Cumberland and Pennrylvana, Railroads amounts to 192,030 tons, as compared with the corresponding period in 1876.

Shipments of coal at Pictou, N.S., for the week ending Aug. 3 and year from January 1:

	Week.	Year
To Canada	3,809	20,406
" United States	906	11,143
" Other Provinces	3,948	27,566
Total tons	8,663	59,115

The Receipts of Coal at Rondout, N.Y., by the Delaware & Hudson Canal for the week ending Aug. 8 were 197 boats, carrying 25,254 tons.

Belvidere Delaware RR. report for week ending Aug. 4.	Week	Year. 1877.	Year. 1876.
Coal for shipment at Coal Port (Trenton)	40	12,286	138,876
" " " " South Amboy	1,341	350,963	248,625
Coal for distribution	1,054	98,318	86,785
Coal for Company's use	1,278	42,598	34,472

The production of Bituminous Coal for the week ending Aug. 4 was as follows:

Tons of 2,000 lb., except where otherwise designated.

	Week, Tons.	Year, Tons.
Cumberland Region, Md..		
Tons of 2,240 lb.	7,404	747,246
Barclay Region, Pa.		
Barclay RR. tons of 2,240 lb.	9,553	189,809
Broad Top Region, Pa.		
Huntingdon and Broad Top RR.	3,280	78,150
*East Broad Top.	839	29,136
Clearfield Region, Pa.		
*Snow Shoe	568	23,687
*Tyrone and Clearfield	15,016	729,116
Allegheny Region, Pa.		
*Pennsylvania RR.	856	109,411
Pittsburg Region, Pa.		
*West Penn. RR.	1,156	104,303
*Southwest Penn. RR.	160	22,551
*Penn & Westmoreland gas coal, Pa. RR.	12	399,745
*Pennsylvania RR.	109	203,271

For one week and two days ending July 31.

† This report was not received this week.

The Production of Coke for one week and two days ending July 31.

Tons of 2,000 lb.	Week.	Year
West Penn. RR.	619	34,948
Southwest Penn. RR.	3,963	340,592
Penn & Westmoreland Region, Penn. RR.	....	42,360
Pittsburg, Penn. RR.	606	69,602
Total.	5,188	487,502

COAL TRADE REVIEW.

NEW YORK, Friday Evening, Aug. 10, 1877.

Anthracite.

The demand is not so great as it was last week, yet as there are not the usual number of companies offering coal, those who are doing business find it quite active. The fear of a scarcity of coal, or a considerable advance in prices, has brought on an abnormal demand that is very rapidly cleaning up the stocks available at tide-water. Should mining be resumed in the Wyoming region at an early day, it would be found that many buyers had anticipated their wants for a considerale time ahead, while there would be found another class of dealers and consumers awaiting a decline in prices, which, if not closely following a resumption of work, would probably lead to a period of considerable quietness.

The Schuylkill region is working very actively, and no further labor troubles are anticipated there at present.

The Philadelphia and Reading Coal and Iron Co, is offering white-ash Stove coal at $3.35, alongside New York, and all other sizes at $3.25.

The Lehigh region is very actively employed. There is a restless element among the miners of this district but it is not thought to be in sufficient force to bring about a stoppage throughout the whole region.

A. Pardee & Co., who fairly represent this region, quote f. o. b., at Amboy, as follows: Lump, $3.50 Broken, Egg and Stove, $3.25; Chestnut, $3; Pea $2.25. For line trade, they quote, at Mauch Chunk: Pea Coal, $1.10; Chestnut, $2.15; and all other sizes, $2.25. This firm is supplying 100 tons per day to one of the furnaces on the line of the Delaware, Lackawanna and Western Railroad.

The strikers in the Wyoming region look more determined than a week ago, yet it has always been impossible to predict with any degree of correctness the actions of this class of men. For months the correspondents of the New York *Herald* and the New York *Sun* have been favoring their readers with sensational descriptions of starvation in this region, and no doubt there is not a little distress among the miners and their families. Yet all late advices indicate the ability of the men to continue the strike for several weeks, if so disposed. The mining companies of this region claim to be practically out of the market. Mr. A. S. Swords offers a limited quantity of Pittston Grate Coal at $2.80; Stove, $3; and small Chestnut $2.50, all at Newburg.

Bituminous.

The business in bituminous coal continues quite unsettled owing to the strikes; prices are quite nominal, and all the available coal is due on contracts made earlier in the season. The Clearfield miners continue very restless and are doing but irregular work. The Cumberland miners are still idle, demanding an advance of 5c. per ton. Two of the collieries are reported to have acceded to the demand for the purpose of supplying some pressing orders, after which they will join the other companies' in resisting what cannot be granted in the present condition of the coal trade.

At last President Gorman, of the Chesapeake & Ohio Canal, and Governor Carroll have concluded that the obstruction of the Chesapeake & Ohio Canal by the boatmen is unlawful, which every one knew long ago, but these gentlemen are afflicted with the curse of our public officers—a thirst for political preferment—and must needs sacrifice the interests of the country at large to the desire of advancing personal ends by currying favor with the rioters, each of whom has as good a vote as the best citizen in the land. The position is unchanged from what it has been for weeks. The strikers have complete possession of this public highway and have openly issued threats against those who might accept a lower rate of freight than that they demand. But even were this not so, their accumulation in force is of itself an intimidation to those who desire to work at the best terms obtainable. The danger of this situation has at last become so evident that prompt action must be taken to reopen the canal, and due punishment be administered to leaders in these unlawful proceedings, irrespective of its influence on the vote at the next election.

What a public shame is this to see officers in the responsible positions held by President Gorman and Governor Carroll coquetting with violators of the law, apparently for fear the performance of their duty may affect their chances of election or re-election. We note that some of the boatmen who set fire to a boat carrying coal for the Maryland Coal Company have been arrested. It is hoped that a proper example will be made of these men, and this disgraceful condition be quickly changed. If the industries of the State of Maryland are to be left by its officials to the government of mobs, capitalists will be careful to avoid investment in its enterprises—its mines or railroads. We can see little difference between government directly by the mob, and by the mob through officials afraid to do their duty.

Gas Coal.—The mining districts of Western Pennsylvania are idle, owing to strikes among the miners. Nova Scotia Coals are showing a slight increase of activity, probably from these troubles.

New York.

Wholesale Prices of Anthracite Coal f. o. b. at the Tide Water Shipping Ports per ton of 2240lb.

Prices being merely nominal this week we omit them entirely.

Wholesale Prices of Bituminous Coal.

Domestic Gas Coals.

Per ton of 2240 lb.	At the Shipping Ports.	Alongside in New York.
Westmoreland and Penn. at Greenwich, Philadelphia	$4 50	$5 50
" " at S. Amboy.	5 00	5 50
Red Bank Cannel Pa. at Philadelphia	8 00	8 50
Youghiogheny, Waverly Co., at Balt	4 50	5 65
Despard, West Va	4 50	6 00
Murphy Run, West Va., at Baltimore	4 50	5 85
Fairmount, West Va., " "	4 40	5 70
Newburg Orrel, Md. " "	4 50	6 00
Cannelton Cannel, West Va.	....	10 00
" Splint " at Richmond.	6 00	7 00
" Gas Coal at Richmond.	4 00	5 65
Peytona Cannel W. Va. at Richmond	....	10 00

Manufacturing and Steam Coals.

These are only nominal.

Foreign Gas Coals.

	Sterling.	Am. cur'cy
Newcastle, at Newcastle-on-Tyne	8/6@10/6	5 50@ 6 00
Liverpool House Orrel, at Liverpool	25/	13 00
Ince Hall Cannel "	35/6	18 00
" Gas Cannel "	25/6	10@10 50
Scotch Gas Cannel, at Glasgow, nominal,	25/ Gold.	7 50
Block House, at Cow Bay, N. S.	1 75	4 50
Caledonia, at Port Caledonia	1 50	4 25
Glace Bay, at Glace Bay	1 60	4 25
Lingan, at Lingan Bay	1 75	....
International mines at Sydney	1 75	4 50
Pictou, Vale mines, at Pictou	2 15	4 75

Retail Prices in New York.

Anthracite.

Per 2000 lbs.	Grate and Egg.	Stove.	Chestnut.
Pittston coal, in yard	$3 75	$4 00	$3 75
Lackawanna coal, delivered	4 00	4 00	4 00
Wilkes-Barre, delivered	4 25	4 50	4 00
Lehigh and Locust Mountain, del'd	4 25	4 50	4 00
Schuylkill Red Ash, del'd	5 25	5 50	4 75

The Cost of delivery for Pittston coal ranges from 40cts. to $1 10 per ton, according to distance from the yard.

Bituminous.

Liverpool House Orrel, delivered, per ton of 2000 lb.				$18 00
Liverpool House Cannel	"	"	"	18 00
American	"	"	"	11 00
Cannelton Block, or splint,	"	"	"	10 00
American Orrel	"	"	"	11 00
Red Bank Cannel	"	"	"	9 00
Cumberland	"	"	"	7 00

Baltimore. Aug. 8, 1877.

Specially reported by Messrs. E. STABLER JR., & Co.

Wholesale Prices.

AFLOAT BY CARGO PER TON OF 2,240 LB

Lump and Steamboat	$3 40	Stove	$3 65
Broken	3 25	Chestnut	3 40
Egg	3 30		

In cars in dealers' yards or on switch, 15c. per ton additional.

Lykens Valley Red Ash.

AFLOAT BY CARGO.		BY RAIL IN CARS.	
Broken	$3 98	Broken	$4 15
Egg	4 13	Egg	4 30
Stove	4 13	Stove	4 30
Chestnut	3 36	Chestnut	3 80

From wharf or yard to the trade, 50c. per ton additional.

Bituminous.

George's Creek, f. o. b. at Locust Point.			$3 50 to $3 60
Clearfield, "	Canton	3 30 to	3 40

Boston. Aug. 4, 1877.

COAL.—The market is firmer on account of the strikes. The bids for 1,500 tons broken coal for the Government were awarded to Howard Snelling & Co. at $4.44. He has to furnish the coal when wanted. Coal freights from Philadelphia now rule at $1.10@1.20; Baltimore, $1.25@1.35; Alexandria and Georgetown, $1.40@1.50; New York, $1@1.10.

We quote Boston wholesale prices as follows:

Anthracite, broken	$4 25@4 40	Cannel, English	$16 00
do. egg	4 25@4 40	do. Buckeye	10 00
do. stove	4 50	Lingan	4 00
Cumberland	4 75	Pictou	5 00
Clearfield	4 50	Penn	5 50
Westmoreland	6 00	Youghiogheny	4 50@5 50
Caledonia	4 00		

—*Commercial Bulletin.*

Buffalo. Aug. 8, 1877.

Specially reported by LEE & LOOMIS.

	Lump.	Run of Mine.	Nut.	Slack.
Connellsville Coke	$5 10	....	.....	....
Brookfield Coal	4 00	....	.....	....
Brier Hill	3 85	....	2 85	....
Youghiogheny	4 00	....	.....	....
Monterey, Catfish	3 25	3 00	.....	2 25
Stoneboro'	....	.... broken	2 75	2 25
Sterling Cannel	5 00	4 75	4 50 nut & slack	....
Reynoldsville	3 25	3 00	1 90	2 25
Buffalo Coal Company	....	3 00	.....	2 25

The Scranton, Wilkes-Barre, Plymouth, Shamokin, and Delaware and Hudson (Lackawanna) are offered for the present at the following prices per ton of 2,000 lb. :

Delivered at	Elmira.	Ithaca.	Syracuse.	Rochester.	
	Afloat.	Afloat.	Afloat.	Afloat.	Ret. Del.
Lump	....	....	....	....	....
Grate	$3 50	$2 85	$2 85	$3 10	$4 35
Egg	3 50	2 95	2 95	3 20	4 45
Stove	3 75	3 20	3 20	3 45	4 70
Nut	3 75	3 10	3 00	3 25	4 50

Delivered at	Oswego	Erie.	Buffalo.		
	F. O. B.	F. O. B.	Afloat.	F. O. B.	Ret. Del.
Lump	....	....	....	....	....
Grate	$3 25	$3 75	$3 35	$3 75	$4 60
Egg	3 35	3 85	3 45	3 85	4 70
Stove	3 60	4 10	3 70	4 10	4 95
Nut	3 40	3 90	3 50	3 90	4 75

Cost of coal from Erie, Oswego, Sodus Point, or Charlotte for Western market, same as if shipped from Buffalo. Terms cash. All payments to be made in New York city funds:

Chicago, Ill. Aug 8, 1877.

Specially reported by Messrs. RENO & LITTLE.

The following are the prices to-day for coal:

Lackawanna Stove	$6 00	Erie and Brier Hill	$5 50
" Chestnut	6 00	Wilmington and Ill.	3 50@4 00
" Grate and Egg	5 75	Blossburgh	6 50

Cincinnati, O. Aug. 8, 1877.

Specially reported by the Consolidated Coal and Mining Co.

	AFLOAT. Per bush.	AFLOAT. per ton 2,000 lb.	DELIVERED. Per bush.	DELIVERED. per ton 2 000 lb.
Youghiogheny lump	7c.	$1 94	10c.	....
" nut	5 1/2c.	1 53	9c.	....
" slack	4 1/2c.	1 25	8c.	....
Camden, W. Va.	5 1/2c.	1 53	9c.	....
Peytona Cannel	16c.	4 57	20c.	....
Connellsville coke	7c.	3 ..	10c.	....
Youghiogheny coke	5c.	2 64	..	....
Crushed coke	....	....	10c.	....

Anthracite, Wilkes-Barre or Lehigh by car load.....$ ..
" " " " delivered..7 00@7 50

Cleveland, O. Aug 3, 1877.

Specially reported by Messrs. LAMBIE & BATES.

Per ton of 2000 lbs. f. o. b. vessels.

WHOLESALE.

Brier Hill (Church Hill)	3 50
" " No. 2 Grades	3 35@3 40
Straitsville Lower Vein	2 80
Hocking Valley	2 80
Massillon	2 85
Mineral Ridge (Cambria Mine)	2 85
Tuscarawas Valley	2 30
Columbiana	2 30
Nut coal, various grades	2 20@2 50
Screenings, " "	1 35@1 75
Youghiogheny gas coals	3 75@3 85

The following are the prices established by the Coal Exchange until further notice:

RETAIL TRADE.

	1 to 10 tons.	10 tons. upw'd.
Brier Hill lump	$4 25	$4 00
" " nut	3 75	3 50
Massillon and Mineral Ridge lump	4 00	3 70
" " " " nut	3 75	3 55
Straitsville Lower Vein, Hocking & Shawnee, l'p.	3 60	3 35
" " " " nut	3 40	3 15
Del Carbo lump	3 75	3 50
" " nut	3 50	3 25
Rich Hill lump	3 50	3 35
" " nut	3 25	3 00
Columbiana, lump	3 25	3 00
" nut	2 75	2 50
Lacka'a., Wilkesbarre and Pittston egg and grate,	7 00	6 75
" " " stove	7 50	7 25
" " " chestnut	7 00	7 25

Lehigh $1 25 per ton higher.
All sales to be strictly cash with order or C. O. D.

Hamilton, Ont. Aug. 3, 1877.

Specially reported by H. BARNARD.

I beg to hand you state of our market corrected to date.

Grate	$4 50	Lehigh Lump	$5 30
Egg	4 50	Brier Hill	5 00
Stove	4 75	Massillon	4 50
Nut	4 75	Blossburgh	5 50

Louisville, Ky. Aug. 5, 1877.

Specially reported by Messrs. BYRNES & SPEED.

Below find latest quotations:

WHOLESALE.

Pittsburg	7c. per bush.	Pine Hill	8 1/2c. per bush.
Raymond City	7c. "	Kentucky	7 1/2c. "

RETAIL.

Pittsburg	11c. per bush.	Pine Hill	11c. per bush.
Raymond City	10c. "	Kentucky	10c. "
Indiana Cannel	17c. "	Honeywell Can'l	19c. "
City Make Coke	8c. "	Anthracite $8 50 to $9 per ton.	

Montreal. Aug. 8, 1877.

Specially reported by Messrs. ROBERT C. ADAMS & CO.

We have no change to report in bituminous coal, but the prices of anthracite have advanced in sympathy with American markets. An increased demand was manifested for a while, which has now subsided. Quotations are:

Scotch Steam	$4 25	Cape Breton Steam	$3 50
Pictou	4 00	Newcastle Smiths	5 00

Anthracite at retail, per 2,000 lb. delivered.

Egg	$5 00	Chestnut	$5 00
Stove	5 25		

Milwaukee, Wis. Aug. 3, 1877.

Specially reported by Messrs. R. P. ELMORE & CO.

Retail price per ton of 2,000 lb.

Anthracite, egg, chestnut, and stove.....$5 50

Wholesale price per ton of 2,000 lb.

Lehigh lump	$6 50	Connellsville coke on RR. track	$7 25

New Orleans, La. Aug. 1, 1877.

Specially reported by Messrs. C. A. MILTENBERGER & CO.

Coal on hand August 1: Pittsburg coal 134 boats and 4 barges; St. Bernard, 7 boats. Consumption during July: Pittsburgh coal, 19 boats, 5 barges and 1 French creek. Arrivals during July: Pittsburg coal, 35 boats and 8 barges; St. Bernard coal, 4 boats.

We have no change to report in market prices for coal since our last. Stock small and demand limited.

PITTSBURG COAL.

At wholesale (by boat load)	35c. per bbl.
To steamboats	40c. "
" manufactories	50c. "
" families	65c. "
In hhds. (for shipment)	$6 00 per hhd.

ANTHRACITE COAL.

At wholesale	$7 00 to 8 00 per ton.
" retail	11 00 "

VIRGINIA CANNEL COAL.

At retail	$1 00 per bbl.

ST. BERNARD (KY.) COAL.

To steamboats	40c. "
" families	55c. "

Philadelphia, Pa. Aug. 9, 1877.

Specially reported.

Both the local and shipping trades are fairly active. The strike in the Schuylkill region, which was inaugurated at Shenandoah, and threatened at one time to spread all over the county, is now ended. The rise in prices is maintained. Rates are firm at $2.80 for Egg, and $3 for Stove, on board. Egg is very active, and Stove, which had been the dull size so far this season, is firmer every day. Broken is mostly shipped on season contracts. To the city and line trades there has been an advance of 25c. per ton on Stove; 15c. on Broken and Egg, and no change on other sizes. Vessels were quite scarce during the beginning of the week, and freights are rising gradually. $1.10@$1.15 is paid to Rhode Island, and $1.15@$1.20 for Boston and Portland.

Pittston, Pa. Aug. 9, 1877.

Pennsylvania Coal Company's Coal in yard, ton of 2000 lb.

Retail.

Lump, Egg and Stove	$2 25
Chestnut	2 00
Pea	1 00

Delivered, fifty cents per ton additional

Richmond, Va. Aug. 8, 1877.

Specially reported by S. H. HAWES, Dealer in Coal.

Per ton of 2,240 lb., f. o. b.

Kanawha Cannel	$9 00	New River Bituminous	$3 30
Coalburg Splint	5 70	Clover Hill Coal	3 00
Lewiston "	5 70	James River Bitum	3 50
Kanawha Gas Coal	4 90	" " Carbonite	5 25

Sandusky, O. Aug 8, 1877.

Specially reported by C. E. BLACK, Agt. Con. Coal & Mg. Co.

We quote coal on cars at Sandusky, as follows:

Per ton of 2,000 lbs.

Anthracite.

	Grate.	Egg.	Stove.	Chestnut
Wilkes-Barre	$4 80	$4 80	$4 80	$4 80
Lackawanna	4 80	4 80	4 80	4 80
Lehigh	5 80	5 80	5 80	5 80

Bituminous.

Massillon	$2 90	Straitsville	$2 65
Del Carbo	2 65	Shawnee	2 65
Hocking Valley	2 65	Blossburg	4 75

Prices f. o. b. vessel for soft coal, 15c. advance on car prices. Prices retailed delivered 50c. above car prices.

St. Louis, Mo. Aug. 7, 1877.

Reported by JAS. J. SYLVESTER, Secretary of the Anthracite Coal Association.

Retail prices, delivered. Ton of 2,000 lb.

ANTHRACITE.

	per ton.		per ton.
Lackawanna	$8 00@8 50	Schuylkill	8 00@ 8 50
Wilkes-Barre	8 00@8 50	Lehigh	9 00@ 9 50

BITUMINOUS.

Blossburg	9 00	Big Muddy	3 00
Pittsburg	4 50	Illinois Coals	2 50@3 00
Indiana Block	4 00	Connellsville Coke	6 50

San Francisco, Cal.

From the *Commercial Herald* of Aug. 2, 1877.

COAL—Imports from January 1 to July 1:

	Tons.		Tons.
Anthracite	9,602	Vancouver Island	43,705
Australian	28,390	Rocky Mountain	113
Coos Bay	17,079	Saghalien	40
Cumberland	7,845	Seattle	55,051
English	40,734	Bellingham Bay	6,200
Chili	3,951	Ione, Cal.	764
Mt. Diablo,	39,995		

The supply of both home and foreign is liberal. The last cargo sale of Australian Wallsend coming to our knowledge was at $9.25. Pacific Coast coals generally command $8 which is also the cargo price of British Columbia Coals. The arrivals since our last reference embrace the following: From Seattle, bark *Malay*, 1,200 tons; *Courser*, 500 tons; *Washington*, 1,500 tons; *El Dorado*, 1,900; *Gem of the Ocean*, 1,100; *Whistler*, 750 tons. From Nanaimo, *Alden Besse*, 1,237 tons; *Henry Buck*, 1,100 tons; *Valpariso*, 450 tons Wellington; *Deux Amis*, 600 ditto; steamer *Empire*, 500 tons Coos Bay. Quotations given are largely nominal. Egg size Pacific Coast bituminous is selling by the cargo at $5@5.50 per ton, while coarse kinds of Seattle, Nanaimo, Wellington, Coos Bay and Bellingham Bay screened may be quoted at $8@8.50 per ton, according to quantity. Black Diamond and other California Mt. Diablo coals sell at $5.75@7.75 for fine and coarse respectively. Prices of Scotch and English Steam to arrive may now be quoted at $8.50@9; West Hartley $9@9.50.

Toledo, Ohio. Aug. 8, 1877.

Specially reported by Messrs. GOSLINE & BARBOUR

We report prices of coal on cars at Toledo as follows:

Ton of 2,000 lb.

Straitsville lump	$2 70	Hocking Valley nut	2 30
" nut	2 30	Massillon lump	3 00
Shawnee lump	2 70	Cumberland	5 40
" nut	2 30	Blossburg	5 40
Hocking Valley lump	2 70		

	Grate.	Egg.	Stove.	Chestnu
Pittston	$4 95	$4 95	$5 20	$5 10
Wilkes-Barre	4 95	4 95	5 20	5 10
Lackawanna	4 95	4 95	5 20	5 10

For retail delivery in city the prices are as follows: Stove and chestnut $5.75; grate and egg, $5.50 per ton.

Prices soft coal f. o. b. vessel for Lake shipments will be from 15 to 20c. per ton more than prices on cars.

Rates of Transportation on Anthracite Coal to Tide Ports.

Schuylkill Coals. per ton of 2240 lb.	From Pine Grove.	From Tamaqua.	From Schuylkill Haven.
To *Port Richmond*, via P. & R. R. R., Main Line, for shipment	1 45	1 40	1 25
Harrisburg, via Lebanon Valley Branch	98	1 37	1 22
Allentown, via East Pennsylvania Branch	1 22	1 17	1 02
Lancaster, and Points on Lancaster Branch, via R. & C. R.R.	1 30	70	1 25	1 10
Dauphin, via Schuylkill and Susquehanna ranch	70	1 18	1 03
Statedale Junction, via Berks and Lehigh ranch	1 34	1 29	1 14
Lebanon, via Lebanon and Tremont ranch	82	....	....

From *Tamanend*, to *Catawissa*, *McAuley*, *Mainville*, *Rupert*, and *Danville*, via Catawissa and Williamsport Branch Railroad 90

From *Tamanend* to *Williamsport*, *Hall's*, and *Montoursville*, via Catawissa and Williamsport Branch Railroad 1 25

Coal sent to points on the Catawissa and Williamsport branch will be charged one and one-half cent per ton per mile, and two cents per ton additional to Tamanend.

From *Port Clinton* to *Philadelphia* via Schuylkill Canal, including freight and charges for the use of cars and barges, and for tolls (exclusive of cost of unloading).... 1 04

An additional charge of 25 cents per ton will be made on Chestnut and Pea Coal to whatever point consigned. If the shipper signs a release of all demands arising from a deficiency of weight at the place of destination, and agrees to indemnify the company from all claims by reason thereof, such additional charge will not be made. Releases, properly prepared, will be furnished, and can be signed at the coal offices of the company, at St. Clair, Palo Alto, Schuylkill Haven, Mount Carbon, Pine Grove, and Tamaqua.

For shipment via Main Road or Schuylkill Canal, one and one-half cent per ton per mile, and two cents per ton additional to Schuylkill Haven, Pine Grove, Tamaqua, or Port Clinton, for Canal, as the case may be.

For consumption at local points in coal region, including Shamokin, Herndon, Schuylkill Haven, Pine Grove, and Tamaqua, three cents per ton per mile, and two cents per ton additional; and a charge for *car service*, of fifteen cents per ton to individuals, and five cents per ton to manufacturers, when in Philadelphia and Reading Railroad cars, provided no charge, including freights, tolls, and car service, shall be ess than twenty-five cents per ton.

Sent westward via Northern Central Railway (in N. C. R W. Co.'s cars), four and two-tenths cents per ton per mile, to Locust Gap, Shamokin, or Herndon. provided no charge will be made less than fifteen cents per ton.

One mile extra will be added for coal passing through the East Mahanoy Tunnel.

Fractions of distances and rates will always be stated in *tenths*.

No charge will be made for weighing or making returns of coal shipped, and the latter will be furnished free of charge, upon application to the Weighmaster; if these returns are to be sent by mail, envelopes, properly stamped and addressed, must be furnished to the Weighmasters.

All coal will be charged the rates (both lateral and Main Line) current on the day it is weighed; it will also be way billed on the same day.

Circulars relating to freights on Schuylkill coals will be found in the issue of this Journal of March 24 d March 31 in the "Coal Trade Review."

Lehigh and Wyoming Coals.

per ton of 2240 lb.

	From Penn Haven.	From Mauch Chunk.	From Hazleton.	From Upper Lehigh.	From Ashley and Sugar Notch.
To † Newark, N. J. (117 miles) via Central Railroad of New Jersey	1 36	1 22	1 80	1 10	1 92
† Mauch Chunk, Pa., via Central Railroad of N. J.	14	...	58	49	....
† Phillipsburg, N. J., 46 miles	0	56	1 14	1 05	1 26
Elizabethp't, 114 miles Pt., Johns., Hoboken & South Amboy, N. J., shipping and wharfage 15c. add.	1 05	86	1 44	1 35	1 56
High Bridge, N. J.	1 80	1 60	2 58	2 19	7 30
Elizabeth, Cranford, Westfield & Elizabethport, for consumption.	1 80	60	2 18	2 19	2 30
Jersey City, N. J., (121 miles) and New York, via L. V. RR.	1 59	1 22	2 01	1 92	2 15

From *Mauch Chunk* to *New York* (121 miles), (towing limits and Jersey City‡ via Lehigh Valley RR. $1 25

From *Mauch Chunk* to *Philadelphia* (93 m via L. V. and L. and S. RR. and North Penn. RR. 1 25

From *Mauch Chunk* to *Philadelphia* (92 m) via L. V. and Perkiomen RR. 1 40

For way points between *Mauch Chunk* and *Phillipsburg* on the New Jersey Railroads. 1 00

From *Phillipsburg, N. J.*, to *Hoboken* (84 m) for shipment via Delaware, Lackawanna & Western RR., Morris and Essex Division. 65

From *Phillipsburg, N. J.*, to *Newark* (75 m) via Delaware, Lackawanna & Western RR. 66

* Rates on line coal from Hazleton are 10c. per ton above these figures.

† The cost of unloading is to be added to these rates. No charge less than 40c. per ton will be made for any distance. Tolls from Mauch Chunk to Phillipsburg for way points will be $1 00 per ton.

‡ On coal received by canal at Jersey City, a charge additional to the freight, of twenty cents per ton, will be made for transferring it from boat to boat, and thirty cents per ton for placing the same on the wharves and reshipping.

The distances in the above table are computed from *Mauch Chunk*. From *Ashley* to *Mauch Chunk* the distance is 51 miles, and from *Upper Lehigh*, 33 miles. From *Hazleton* 24 miles, and from *Penn Haven* 8 miles.

From *Wilkes-Barre* to *Perth Amboy* via the Lehigh Valley Railroad Company, the distance is 161 miles, and from *Mauch Chunk* it amounts to 106 miles.

OFFICE OF THE PA. & N. Y. R. R. Co.,
Bethlehem, Aug. 6, 1877.

On and after this date the rate on coal for Buffalo, for Watkins, Ithaca, and Weedsport, for water shipment; Auburn, for New York Central R. R.; Sterling, for Lake Ontario Shore R. R., and Fair Haven, will be 90 cts., per gross ton, between Coxton and Waverly. On all coal transhipped at Waverly into broad guage cars, an additional charge of 10 cts. per ton will be made to cover the expense thereof. The full rate from Coxton to Buffalo is $2.46; to Rochester, $2.22.

ROBERT H. SAYRE, President.

Geneva, Ithaca and Sayre Railroad.—The rates of transportation on coal from Coxton, Pa., per ton of 2,240 lb., from and after August 6, will be asfollows:

To East Waverly, N. Y.	$1 75
" Ithaca for C. Lake RR. (local)	1 64
" " for C. L. RR. and for shipment via Erie Canal	1 25
" Van Etten, for U. I. and E. RR.	1 61
" Geneva (local)	1 62
" Geneva for S. P. and S. and L. O. S. Railroads, and for N. Y. C. and H. R. RR., except Auburn and Cayuga	1 62
To Geneva for Buffalo and Tonawanda	1 49
" " " Genesee Docks	1 44
" " " Rochester and Charlotte	1 58
" " " Auburn and Cayuga	2 50
Total rate to Buffalo	2 46
" " " Rochester	2 22

REGULATIONS.

A charge of fifteen cents per ton will be collected of each consignee on all coal not unloaded within twenty-four hours after its arrival, and an additional charge of ten cents per ton for every twenty-four hours thereafter; Sundays and legal holidays excepted.

No allowance will be made for coal lost from cars on account of broken doors or other defects existing when the cars are loaded.

Seventeen cents per ton will be charged, at Ithaca Docks, for shipping coal direct from cars to vessels, and 12 cents per ton additional from stock, making a total charge on what is shipped from stock of 29 cents per ton.

All freights will be collected weekly, by drafts on shippers, from Coxton to destination.

Lake Freights on Coal.

From Buffalo to Chicago	$0.30@0.55
" " " Milwaukee	0.40@0.55
" " " Michegan City	0.60
" " " Toledo, O	0'20
" " " Sandusky	0'20
" " " Detroit	0'20
From Cleveland to Chicago	0'40@0.50
" " " Milwaukee	0.50@0 55
" " " Detroit	0.30
" " " Toronto and Hamilton, gold	1.00
" " " Marquette	0 30
" " " Duluth	0.50@0.65

For freights on anthracite coal from *Newburg and Rondout* we refer to our issue of July 21.

For rates of transportation on coal via the *Erie Canal* we refer to our issue of July 21.

Freights

Representing the latest actual charters up to August 9.
Per ton of 2240 lb.

PORTS.	From Philadelphia.	From Baltimore	From Georgetown.	From Elizabethport, Port Johnson, South Amboy, Hoboken and Weehawken.
Augusta, Me.	....	....	....	1 50
Albany	...	...	....	....
Alexandria, Va	....	50	....	....
Annapolis, Md.	....	....	....	...
Bangor, Me.	1 15	1 50	....	90
Bath, Me.	1 00	1 25	....	1 00
Baltimore	45@80	....	....	...
Boston, Mass.	105@125	1 25	....	90
Bridgeport, Ct.	...	1 20	....	50
Bristol, R. I.	...	..	....	80
Beverly, Mass.	....	..	....	1 00
Cambridgeport, Mass.	1 25	....	....	90
Charleston, S. C.	90	....	....	....
Danversport, Mass.	1 15	....	....	....
East Greenwich, R. I.	....	....	....	....
Fredericksburg, Va.	....	....	....	....
Fall River	100@105	1 13	....	80
Gloucester	110@115	..	....	....
Hingham, Mass.	....	....	....	....
Hartford, Conn.	....	....	....	....
Hoboken	....	....	....	35
Hudson	....	....	....	...
Jersey City	....	....	....	35
Lynn, Mass.	1 30	..	....	....
Medford, Mass.	1 50	....	....	....
Middletown	....	....	....	....
Marblehead, Mass.	1 10	....	....	....
Nantucket, Mass.	....	....	....	80
New Bedford	100@105	1 20	....	80
Newburyport	...	1 35	....	1 00
New Haven	....	1 13	....	50
New London	....	1 13	....	....
Newport	105@110	....	....	80
New York	90	1 10	....	35
Norfolk	50	....	....	75
Norwalk	....	....	....	50
Norwich	....	....	....	....
Pawtucket	....	....	....	90
Philadelphia	....	....	....	....
Portland	80†	1 25	....	90
Portsmouth, N. H.	115@120	1 35	....	....
Providence	100@105	1 13	....	....
Poughkeepsie, N. Y.	...	....	....	....
Quincy Point, Mass.	....	....	....	....
Richmond, Va.	....	....	....	....
Salem, Mass.	...	1 25	....	90
Savannah, Ga.	1 17½	....	....	....
St. John, N.B.	1 15	....	....	....
Somerset, Mass.	1 05	....	....	....
Thomastown, Me.	....	....	....	....
Troy	....	....	....	....
Trenton, N.J.	....	....	....	....
Washington	65	....	....	....
Wilmington, N.C.	...	..	...	...
Wareham	....	1 25	....	....

* And discharging and towing. † And discharging. ‡ And towing. § 3c per bridge extra.

Rates of Toll

For the above we refer to our issue of July 21.

Towing.

For rates of towing we refer to our issue of Aug. 4.

Freights on Bituminous Coals from the Mines to Tide Water Shipping Ports.

For the above rates we refer to our issue of Aug. 4.

IRON MARKET REVIEW.

New York.

FRIDAY EVENING, Aug. 10, 1877.

American Pig.—The furnaces on the Lehigh are again receiving their usual supply of coal with no indications that there will be further immediate difficulty with the miners, although there are a few disaffected ones in the Lehigh region. Makers show a greater inclination to sell again. We only learn of 500 tons of Nos. 1 and 2 foundry iron sold on private terms. The consumption of iron at the presene time is very much reduced. Prices have not been strengthened by the strikes. We quote No. 1 foundry at $18@19; No. 2, $17@18, and forge, $16@17.

Scotch Pig.—Although late advices from Scotland note a smaller number of furnaces in blast, and a proposition to stop work at one-third of those now running, yet there is no improvement in this article either in Glasgow or this city. The business here is confined to sales of small lots, with but few transactions. We quote Eglinton at $26.50; Coltness, $26.50; and Glengarnock, $25@25.50.

Messrs. John E. Swan & Brothers (Limited), of Glasgow, under date of July 27, report 108 furnaces in blast, as against 115 a year previous; quantity of iron in Connal & Co.'s stores, 148,488 tons, as against 72,693 tons a year previous; shipments for week ending July 21, 699 tons greater than for the corresponding week of 1876, and from December 25, 1876, 9,587 tons in excess of shipments for like period of 1875-6. They quote No. 1 Pig Iron as follows: Gartsherrie, 62/; Coltness, 65/; Summerlee, 59/6; Langloan, 62/; Glengarnock, 59/, and Eglinton, 55/6. Freights were as follows: to New York, 2/; Boston, 9/; New Orleans, 5/; Baltimore 8/; Philadelphia, 7/6; Montreal, 10/, and San Francisco, 25/.

Rails.—We note a sale of 3,000 tons of steel rails, of Pennsylvania make, delivered in Chicago, at $47.50. Prices show no improvement. Iron rails are exceedingly quiet. We quote steel rails, at mills, at $42@45; and iron rails at $33@36.

Old Rails.—A sale of 2,000 tons at $20, at Philadelphia, a week or two ago, is reported. In this market we note no business, and continue to quote, nominally, at $19.

Scrap.—We note a sale of 400 tons of No. 1, Wrought, to arrive, on private terms. We quote at $23.

Specially reported by Messrs. R. C. HOFFMAN & Co.

Baltimore, Md. Aug. 6, 1877.

Our iron market remains dull and inactive, but better inquiry and light sales at about quotations.

Baltimore Charcoal....$29@31	Mottled and White..$15@16 00
Virginia Charcoal..... 28@31	Charcoal C. B. Blooms 55@60 00
Anthracite No. 1.....19@20	" " Billetts. 60@62 00
" " 2.....18@19	Refined Blooms.... 45@50 00
Anthracite No. 3.....17@18	

Boston. Aug. 4, 1877.

Pig continues extremely dull in all the markets, spite of the stoppage of receipts from the Lehigh region, and the uncertainty caused by the general coal strike. The flurry in the Shawnee region of Ohio will add somewhat to the production, but it will be mainly of one grade—foundry for stove purchases—and can have but little effect ontside of that.

We quote $22@$23 for No. 1, $21@$21.50 for No. 2, and $20.50@$21.50 for gray forge. Scotch pig is dull at $24@$30 for store lots. The foreign markets are cabled firmer late in the week.

Bar is dull, quoting $46@$47 for refined, and $37@$38 for common. Nails are in light demand at unchanged prices. Sheet is selling at 3c.@3¼c. per pound. Russia is quiet at 12c. currency. We quote English spring steel 7@8c. gold; 9@11c. for German; 9@11c. for machinery; 14@15c. for cast; 10@12c. for blister; 8c. for American spring; 13½@14c. for cast; 9c. for blister; and 8c. for machinery.—*Commercial Bulletin.*

Chattanooga, Tenn., Aug. 7, 1877.

Specially reported by J. F. JAMES, dealer in pig iron, ores, etc.

Demands for all grades of pig metal is very light. Prices have weakened considerably during the past two weeks, indeed some of the furnaces, to keep afloat awhile longer refuse no offer for cash at figures within two dollars below market prices. No large sales worthy of note to report.

The market here remains dull and unchanged.

Tenn., Ala. and Ga. Charcoal, No. 1 Foundry	$18 00@19 00
Tenn., Ala. and Ga. Charcoal, No. 2 Foundry	17 00@18 00
Tenn, Ala and Ga. Charcoal, Gray Forge	15 00@16 00
Tenn., Ala. and Ga. Coke, No. 1 Foundry	19 00@20 00
Tenn., Ala. and Ga. Coke, No. 2 Foundry	17 00@18 00
Tenn., Ala. and Ga. Coke, Gray Forge	16 00
Charcoal or Coke, white and mottled	14 00@15 00
Tenn., Ala. and Ga. Cold Blast (car wheel)	22 00@28 00
Old rails	18 00@19 00
Old car wheels	16 00@17 00
Wrought scrap, No. 1	17 00
Wrought scrap, No. 2	12 00
Cast scrap	10 00
Muck bar	32 00@33 00

Iron Ores.

Red Hematite (about 55 per cent. metallic iron) f. o. c. at mines	1 25
Brown Hematite (about 55 per cent. metallic iron)	1 75

Cincinnati, O. Aug. 7. 1877.

Specially reported by Messrs. TRABER & AUBERY, commission merchants for the sale of pig iron, blooms, ore, etc.

Below we hand the closing quotations of our pig iron market.

CHARCOAL.

Hanging Rock A1 Extra	$25 00@25 50	—4 mos
" " No. 1 Foundry	24 00@	—4 mos
" " No. 2 "	23 00@23 50	—4 mos
" " Soft Silver Gray	22 00@22 50	—4 mos
" " Mill	20 00@21 00	—4 mos
Tennessee, No. 1 Foundry	22 50@23 00	—4 mos
" " 2 "	21 50@22 00	—4 mos
" " Mill,	20 00@	—4 mos

STONE COAL.

Ohio, No. 1 Foundry	21 00@	—4 mos
" " 2 "	20 00@20 50	—4 mos
" Silvery	19 00@	—4 mos
" Mill	19 00@20 00	—4 mos

COKE.

Ohio & W. Va. No. 1 Foundry	23 00@24 00	—4 mos
" " " 2 "	22 00@22 50	—4 mos
" " Mill	19 00@20 00	—4 mos

CAR-WHEEL.

Hanging Rock, C. B. Car Wheel	35 00@40 00	—4 mos
Tennessee, "	30 00@	—4 mos
Missouri, "	30 00@33 00	—4 mos
Alabama, "	33 00@	—4 mos

BLOOMS.

Charcoal	50 00@ ....—cash.

SCRAP IRON.

Cast	50c.@ 65c.— "
Wrought	75c.@1 15 — "

Cleveland, O. Aug. 3. 1877.

Specially reported by Messrs. C. E. BINGHAM & Co.

Per gross ton, on four months' time. Subject to change in market. Discount for cash 4 per cent.

FOUNDRY IRON.

No. 1, L. S. Charcoal..	$25 00	Am. S., No. 1, Ch Val.	$24 00
No. 2, " " " ...	25 00	" " " B. 1, " " ..	22 00
No. 1, Anthracite.....	23 00	" " " No. 2, " " ..	20 00
No. 2, "	21 00	No. 1, Massillon.....	24 00
No. 1, Bituminous.....	24 00	B—1, "	22 00
No. 2, "	22 00	No. 2, "	20 00

CAR WHEEL AND MALLEABLE IRON.

No. 3 L. S. Charcoal...	26 00	No. 5 & 6, L. S. Charcoal	$27 00
No. 4, " " " ...	26 00		

BESSEMER IRON.

Nos. 1 & 2, L. S. Char..	$26 00

FORGE IRON.

No. 1, Gray.....	$19 00	White and Mottled....	$18 00

Louisville, Ky. Aug. 7, 1877.

Specially reported by Messrs. GEORGE H. HULL & Co.

Market steady at present low prices, with a fair demand for foundry irons. The usual time, four months, is allowed on the quotations below.

FOUNDRY IRONS.

No. 1 Hanging Rock, Charcoal.....	$23 00@24 00
No. 2 " " " "	20 00@21 00
No. 1 Southern Charcoal.....	20 00@21 00
No. 2 " " "	19 00@20 00
No. 1 Hanging Rock, Stonecoal and Coke.....	20 00@22 00
No. 2 " " " " " "	19 00@20 00
No. 1 Southern Stonecoal and Coke	19 00@20 00
No. 2 " " " " "	18 00@19 00
"American Scotch".....	20 00@22 00
Silver Gray.....	18 00@19 00

MILL IRONS.

No. 1 Charcoal, Cold-short and Neutral.....	18 50@19 50
No. 1 Stonecoal and Coke, Cold-short and Neutral	18 00@18 50
No. 2 " " " " " " "	17 50@18 00
No. 1 Missouri and Indiana Red-short.....	21 00@22 00
White and Mottled, Cold-short and Neutral.....	15 00@16 00

CAR-WHEEL AND MALLEABLE IRON.

Hanging Rock, and Cold Blast.....	34 00@38 00
Alabama and Georgia "	2? 00@33 00
Kentucky Cold-blast.....	25 00@33 00

Milwaukee, Wis. Aug. 7, 1877.

Specially reported by Messrs. R. P. ELMORE & Co.

Wholesale Price.

Charcoal Iron.

No. 1 Lake Superior per gross ton.....	$25 00—4 mos.
No. 2 " " " "	24 00—4 mos.

Anthracite Iron.

No. 1 anthracite per gross ton.....	$25 00—4 mos.
No. 2 " " "	24000—4 mos.

Stone Coal & Coke.

Wholesale Price.

Warner's Am. Se'th (Bk. Bend) per ton..	$25 00@ ....—4 mos.
Soft Silvery per ton.....	22 0c@23 00—4 mos.
Lake Superior and Lake Champlain ores	24 00@25 00—4 mos.
Sharpsville (Penn.) native ores.....	24 00@25 00—4 mos

Car Wheel.

Lake Superior ores per ton.....	.....$25 00@27 00—4 mos

Pittsburgh, Pa. Aug. 7, 1877.

Specially reported by A. H. CHILDS.

A general strike of coal miners throughout the country has for the present dispelled all hopes of a more active demand for pig iron. Many of the mills have already been compelled to stop, and others must do the same if the trouble continues. Prices are unchanged.

	4 mos.		4 mos.
No. 1 F'dry.....	$22 00@24 00	Mottled&White.	$16 50@18 00
" 2 "	21 00@22 00	Hot blast C'coal.	22 00@28 00
Gray Forge.....	18 50@21 00	Cold " Western	——@——

Richmond, Va. Aug. 7, 1877.

Specially reported by ASA SNYDER, Esq.

Charcoal pig iron continues inactive. Foundry iron in small lots sell quite freely.

Virginia Cold Blast Charcoal Pig Iron, cold blast....	$21 to $25	
" " " " " " neutral.....	30 to 32	
" Warm " " " "	24 to 28	
" Anthracite 1 X.....	20 to 21	
" " 2 X.....	19 to 20	
" " 2	18 to 19	
" " Coke Quinimont 1 X.....	22 to 23	
" " " " 2 X.....	21 to 22	

San Francisco, Cal.

From the *Commercial Herald* of Aug. 2:

Stocks of Pig Iron, Tin-plate, etc., are large, and in the absence of sales correct quotations are hard to give. Sydney Block Tin is offered on sale at 17@17½c. The *Alaska* for New York, via Panama, carried 293,146 lb. Pig Lead. The *City of New York*, from Sydney, brought 620 ingots Block Tin.

St. Louis, Mo. Aug. 7, 1877.

Specially reported by Messrs. SPOONER & COLLINS, Commission Agents for all kinds of Iron.

Our market still continues quite dull, though we look for a change for the better now that the strike is over.

COLD BLAST CHARCOAL—ALL NUMBERS

Hanging Rock.....	25@38	Assorted Bar Iron $2, rates.	
Tennessee.....	26@30	No. 1 Wrought Scrap 80c. cwt.	
Kentucky.....	26@30	Heavy cast " 65 "	
Missouri	26@30	Light " " 55 "	
Georgia.....	26@30	Old rails.....	19 00 to 20 00
Alabama.....	26@30	Old car wheels.	17 00 to 18 00

	No. 1.	No. 2.	Mill.	White and Mottl'd.
Missouri stone coal.....	$22 50	$21 50	$20 00	19 00
" charcoal.....	22 00	21 00	20 00	19 00
Tennessee charcoal.....	22 00	21 00	20 00	19 00
Tenn. coke very soft and strong.....	24 00	22 00	20 00	19 00
Hanging Rock charcoal....	25 00	24 00	23 00	.....
" " cold short	24 00	23 00	.....	.....
	Ex No.1	No. 1.	B No. 1,	No. 2.
Alice Hanging Rock coke..	$25 00	$24 00	$23 00	$22 50
Quinnimount, W. Va., coke	24 00	23 00	23 00	22 00

METALS.

NEW YORK, FRIDAY EVENING, Aug. 10, 1877.

The week under review has been a repetition of several weeks past—business has been very limited, with a weakness to prices generally.

Gold Coin.—During the week under review the price of gold has varied from 105⅛ to 105¼, and closed at 105¼.

Bullion.—Silver was up to 54⅜d. in London on the sale of the India bills on Wednesday, but has weakened to 54d., the present nominal quotation. Germany, for the week ending July 28, sold $4,000,000 silver in London. Gold is quoted at par to ¼ per cent. premium.

Daily Range of Silver in London and New York per oz

Date.	London. Pence	New York. Cents	Date.	London. Pence	New York Cents
Aug. 4.....	54⅛	117½	Aug. 8.....	54¼	117¾
" 6.....	....	117½	" 9.....	....	117¾
" 7.....	54⅛	117½	" 10.....	54	117¼

Copper.—There have been large sales for delivery during the balance of the year at from 18¾c. down to 18⅝c. We were unable to learn the exact quantity at the time of going to press. There have also been sales of about 500,000 lb. of copper on spot at 18¾c. down to 18¼c., while there is an offer in the market from which business is likely to result, for 2,000 tons for export at 18c. The market closes steady at 18¼c@18⅝c. for spot, and 18⅝c.@18½c. for deliveries during the remainder of the year. The mining companies' combination has broken. Manufacturers report a better business. Dealers have bought sparingly, manufacturers being the principal buyers. Best selected in London shows a falling off of 10/.

Tin.—The business in this article has been only in a small way with prices weakening, Straits having been down to 15c. We quote to-day, in gold, per lb. as follows: Straits, 15¼@15½c.; L. & F. 15¼@15¼c.; Refined, 15½c.; and Banca, 17½c. Straits in London is quoted at £66 and in Singapore, $19.

Tin Plates.—A better jobbing demand is reported. We quote in gold, per box, as follows: Charcoal tins, $6.62½@6.75, and ternes, 6.12½; coke tins $5.75@5.80, and ternes, $5.5c@5.75.

Messrs. Robert Crooks & Co., of Liverpool, under date of July 26th, say of Tin Plates: "Prices are steady, with a dull market. Charcoal Tins: Demand small, and makers are willing sellers at their quotations. Ternes: There is more inquiry for, and full prices are being paid. Cokes: There has been some business done during the past week in Tins from second hands, realizing 17s 6d, less 3 per cent., and from makers at 17s 9d to 18s. There are no brands obtainable now of B. V. grades, at less than 18s to 18s 3d. Ternes are selling at 17s, and are in fair demand."

Lead.—There has been but a retail business in lead since our last. The market still remains at 5c. for large lots. The shipments of bullion from Utah for the month of July were over 3,000 tons. So long as such a large production continues there does not appear to be anything to prevent the price of lead declining until it reaches a point where it can be sold for export.

Spelter and Zinc.—Spelter, although quiet, is firmer from the inability of some of the Western furnaces to procure coal during the strike of the coal miners. Special brands of Spelter for cartridge manufacture have recently been sold at 9c. gold for foreign shipment. Sheet zinc is firm at 7¼@7½c.

Antimony.—This article is quiet and quoted at 11½c. gold.

Quicksilver.—The San Francisco *Commercial Herald* of Aug. 2, says: "London advices of late date by cable announce a very heavy advance, and also a corresponding upheaving in Hongkong quotations. These somewhat unexpected advices have tended to unsettle holders on this side of the continent, and by reason of temporary short supplies prices here have been run up to 60c. When rates dropped here a few weeks since to 40@42½c. several of our large producing mines closed their furnaces and stopped production. This produced a cessation of supplies, but now we opine that these furnaces will be again rekindled and our receipts again toned up to meet the export requirement should it again set in with vigor. In London July 2d the stock was 25,895 flasks, and the price £7 2s 6d: July 25th the London quotation was £8; 27th, £8 10s; July 31st, £9 10s was cabled, although other parties same day received lower London quotations. Here small sales have been made since our last reference at 50@52½@55c., but this sharp advance stopped shipments to Hongkong. The Belgic hence on the 27th inst. carried but 18 flasks, the smallest shipment to China in months. Since then the Newbern for Mexican ports carried 466 flasks. The Alaska for Panama en route to New York carried 100 flasks. Since writing the above, holders have advanced their rates with small sales at 60@62½c. At the close 65c. is asked. The receipts for the month of July were 5,337 flasks, showing a material falling off as compared with previous months."

Salt Lake Ore and Metal Market.

SALT LAKE CITY, UTAH, Aug. 4, 1877.

Argentiferous Lead (Base Bullion).—$55 per ton for lead. $1.18 per ounce for silver. $20 per ounce for gold. The quotations for silver are based upon the silver contents in the lead of 80 to 120 ounces per ton of 2,000 lb.

Argentiferous Lead Ores.—From $1.00 to $1.05 per oz. for the silver contained therein, based upon a standard of 40 per cent. Lead, each unite above 40 per cent. 50 cents per unit added. And 75 cts. per unit over 50 per cent.

Ores containing Zinc.—For each unit of Zinc above 5 per cent., deduct the value of 1 oz. of Silver.

Silver Ores containing little or no Lead.—Ores with a lime or ferruginous gangue subject to higher rates.

Copper, Antimony, Zinc and Iron Pyrites objectionable in all the above ores.

Below are the shipments of ore and bullion from Salt Lake City for the week ending July 28: Nine cars bullion to New York, 13 car bullion to Omaha, 1 car bullion to Pittsburg, 1 car bullion to St. Louis; 2 cars copper to San Francisco; 7 cars lead ore to Hilliard—total, 33 cars. Bullion, 501,144 lbs.; lead ore, 150,400 lbs.; copper, 40,000 lbs—total, 691,544 lbs.

The New York bullion was shipped via San Francisco.

FINANCIAL.

New York Stocks.

NEW YORK, Friday Evening, Aug. 10, 1877.

The business of the week in the coal stocks has been confined to dealings among professional speculators, and the fluctuations have been entirely the result of manipulation. The sales of Delaware & Hudson Canal Company have aggregated 23,108 shares, at 40⅝@44, closing at 43¼. This company has in the hands of the printer another report as to its condition. This may make its appearance at any moment. The dealings in Delaware, Lackawanna & Western Railroad have amounted to 78,906 shares at 40½@43, closing at 41⅞. New Jersey Central Railroad fell to 10¼ on Tuesday, but recovered to 12⅜ yesterday, closing at 12 to day.

Miscellaneous Sales and Quotations.

Sales and quotations of the stocks and bonds dealt in here and at Philadelphia, for the week ending the 10th inst. are given in the following tables. The Philadelphia quotations will have a * affixed.

STOCKS.

	Quotations.—Highest.	Lowest.	Closing.	Sales Shares
American Coal Co.....	—	—	25	—
*Cambria Iron Co.....	—	—	50	10
*Pennsylvania Salt Manf'g Co.	—	—	58	—
*Westmoreland Coal Co.....	—	—	55	—
*Buck Mountain Coal Co.....	—	—	40	—
*Schuylkill Nav. Co	—	—	—	—
St. Louis, I. M. & S. RR. Co...	8½	7½	8½	300
Spring Mountain Coal Co.....	—	—	30	—

BONDS.

D., L. & W. 7s, Convt., 1892	J. & D.	—	—	1 0	—	
" " " 2d mtge., 1881	M. & S.	—	—	106	—	
N. J. C., 1st mtge., new...	F. & A.	—	—	109⅛	—	
" " " 1st mt., cons. 1899	Q.	68	66⅝	67¼	$8.000	
" " " Convt	M. & N.	64¾	63	64½	28.000	
L. & W. B. Coal Co., cons.	Q.	26	—	—	2.000	
Am. Dock & Imp. 7s.....	J. & J.	41	—	40	4.000	
D. & H. C. Co., 1st m., 1884	J. & J.	91	—	—	1,000	
" " " " " 1891	J. & J.	92	—	92	14.000	
" " " " " 1877	J. & J.	—	—	99	—	
" " " " reg., 1894	A. & O.	—	—	—	—	
" " " " coup., 1894	A. & O.	95¾	—	—	10.000	
St. L. I. M. & S., 1st mt. 1892	F. & A.	99	95	99	99,000	
Ches. & Ohio, 1st mt., 1899	—	—	—	21	—	
*L. V. RR., con. m. 6s, 1923	J. & D.	91½	—	92	1,000	
" " 2d m., 7s, 1910	M. & S.	—	—	112½	—	
" " reg., 1898	J. & D.	110⅜	110	—	9,000	
" " coup., 1898	J. & D.	—	—	—	—	
*P. RR., 1st mtge., 1880	J. & J.	103⅛	105	105	3.000	
" Gen. mtge. reg., 1910	A. & O.	107	—	107	11,000	
" Con. m. 6s. cou.. 1905	J. & D.	—	—	—	—	
" " " reg. 1905	Q.	90¼	—	—	3,000	
" gen. M. Coup., 1910	J. & J.	105½	104¼	105	4.000	
" New Loan 5s		111⅜	110½	—	75,800	
*P. & R. RR., 7s, 1893	A. & O.	—	—	108½	—	
" " con. m. 7s. cou. 1911	J. & D.	95½	95	95½	9,000	
" " Deb. 6s, 1893	J. & J.	—	—	—	—	
" " New convt. 7s. 1893	J. & J.	43	41½	—	2,500	
" " Con. mtge. 7s. reg.	J. & D.	95½	—	94½	4,000	
" " 6s. 1843-80.....	J. & D.	—	—	—	—	
*P. & R. C. & I. Co. Deb. 7s	M. & S.	—	—	—	—	
*P. & R. C. & I. Co.....		—	—	—	—	
*L. C. & N. Co. 6s. 1884	M. & Q.	101½	—	101	200	
" " RR. loan 1897	F. & Q.	101½	101	—	7,700	
" " Con. mtge. 7s.	J. & D.	—	—	—	—	
" " Cvt. gold, 1894	M. & S.	—	—	—	—	
" "Gold Loan, 1897	J. & D.	85	—	85	2,000	
*Schuylkill Nav., 6s. 1897	M. & Q.	—	—	—	—	
*Pa. and N. Y. Canal, 7s..	J. & D.	109	—	—	5,000	
*Pa. Canal Co.....	J. & J.	—	—	—	—	
*Susquehanna Coal Co. 6s.		—	—	—	—	

Total transactions for the week. $381,200

Philadelphia Stocks.

PHILADELPHIA, FRIDAY EVENING, Aug. 10, 1877.

Outside of Pennsylvania Railroad, the coal stocks in this market have been very quiet. The dealings in this stock have aggregated 80,073 shares, at 27⅝@25⅞, closing at 26¼. Philadelphia & Reading Railroad has only varied ¼ during the week, with sales of 2,778 shares. Lehigh Valley Railroad has declined ½ from the opening, with sales amounting to 2,914 shares.

COAL TRANSPORTATION AND GENERAL MINING STOCKS.

Name and Location of Company.		Feet on Vein.	Capital Stock	Shares. No.	Shares. Par Val.	Assessments. Total levied to date.	Assessments. Date and amount per share of last. Mo.	Yr.	Amt.	Dividends. Total paid to date.	Last Dividend. Mo.	Yr.	Amt.	Rate per Ann.	Highest and Lowest Quo. per Share in Currency. Aug. 4. H.	L.	Aug. 6. H.	L.	Aug. 7. H.	L.	Aug. 8. H.	L.	Aug. 9. H.	L.	Aug. 10. H.	L.	Sales.
Coal Stocks.			$			$				$																	
Consol. Coal	Md.	....	10,250,000	102,500	$100	*	.....	.....	.....	...	Jan..	1877	2½	10	..	..	..	..	..	..	..	..	..	..	..	..	....
Del. & H. Canal	Pa.	....	20,000,000	200,000	100	*	.....	.....	.....	38,522,920	Aug.	1876	4	8	41⅜	40⅜	41⅛	38⅞	40½	39⅛	43¾	41	44	42⅝	43⅛	42¼	23,108
Del., Lac. & W. RR.	Pa.	....	26,200,000	524,000	50	*	.....	.....	.....	.....	July	1876	2½	5	42⅜	41¾	42	40⅜	41⅜	40⅛	42⅝	40¾	42⅝	41¾	42½	41½	78,906
Lehigh C. & N.	Pa.	....	10,448,550	208,971	50	*	.....	.....	.....	.. ..	Sep.	1876	1½	6	17⅜	17⅜	..	..	17⅜	17⅝	..	..	..	..	17¾	17½	364
Lehigh Valley RR.	Pa.	....	27,042,900	540,858	50	*	.....	.....	.....	.....	Apr.	1877	1½	6	33¼	33	33¼	33¼	33½	33½	..	..	33⅝	33¼	33⅞	32¾	2,914
Maryland Coal	Md.	....	4,600,000	44,000	100	*	.....	.....	.....	...	Jan..	1876	1½	1½	..	..	..	..	..	..	..	..	..	..	..	..	8	....
N. J. Central RR.	Pa.	....	20,600,000	206,000	100	*	.....	.....	.....	.....	Apr.	1876	2½	10	10⅜	10½	..	..	10¾	10¾	..	..	12⅜	11½	12⅜	12	2,585
Penna. Coal	Pa.	....	5,000,000	100,000	50	*	.....	.....	.....	.....	Aug.	1877	3	12	..	..											140	....
Pennsylvania RR.	Pa.	....	68,868,700	1,377,376	50	*	.....	.....	.....	.....	May.	1877	1¼	6	27	25⅞	27⅜	26½	27¼	26⅛	26¼	25⅞	26½	25⅞	26¼	26⅛	84,073
Phil. & Read. RR.	Pa.	....	34,278,755	685,575	50	*	.....	.....	.....	....	Jan..	1876	2½	10	12¼	12	12¼	12	12¼	12⅛	..	..	12	12	12¼	12	2,778
General Mining Stocks																											
Alpha Cons. G. S.	Nev.	300	3,000,000	30,000	100	180,000	Aug.	1875	$1 00	....	.....	.....	.....	..	..	..	11¾	..	..	..	12	..	..	..	11	..	300
Am. Flag, G.	Colo.	5,300	600,000	60,000	10	*	.....	.....	.....	.....	.....	.....	.....	..	12c	11c	..	..	..	..	10c	..	11c	10c	10c	9c	5,600
Belcher, G. S.	Nev.	1 040	10,400,000	104,000	100	908,400	July	1877	1 00	15,397,200	Apr.	1876	$1 00	12	..	..	..	..	..	..	..	..	..	..	..	..	....
Bertha & Edith G.	Vir.	645 acs.	3,500,000	350,000	10	*	.....	.....	.....	...	.....	.....	.....	..	..	..	..	..	..	..	..	..	1⅜	1¼	1.35	1¼	6,600
Best and Belcher, G. S.	Nev.	545	10,080,000	100,800	100	236,992	Feb.	1877	1 00	....	.....	.....	.....	..	..	..	..	..	..	..	..	..	..	..	..	..	....
Bobtail, G.	Colo.	2,500	1 136,630	227,326	5	*	.....	.....	.....	...	.....	.....	.....	..	1.55	1.45	1.45	..	..	..	..	..	..	..	..	..	1,400
Bobtail Tunnel, G.	Colo.	....	100,000	20,000	5	6,000	July	1873	0 30	20,000	Dec..	1876	.....	..	..	..	..	..	..	..	..	..	..	..	..	..	....
Bullion, G. S.	Nev.	943½	10,000,000	100,000	100	2,552,000	June	1877	1 50	....	.....	.....	.....	..	8½	8⅜	8	7½	8½	8⅜	8⅞	8⅝	..	..	8½	8¼	900
Caledonia, G. S.	Nev.	2.188	10,000,000	100,000	100	1,360,000	June	1877	50	....	.....	.....	.....	..	..	..	..	..	..	..	..	..	..	..	..	..	100
California, G. S.	Nev.	600	54,000,000	540,000	100	...	.....	.....	.....	16,200,000	July	1877	2 00	24	..	..	..	..	..	..	..	..	..	..	..	..	100
Chollar Potosi, G. S.	Nev.	1 400	2,800,000	28,000	100	1,412,000	July.	1877	3 00	3,080,000	Feb..	1872	1 00	12	..	..	..	..	..	..	..	..	..	..	..	..	....
Cleveland, G.	Colo.	3 715	250,000	25,000	10	*	.....	.....	.....	.....	.....	.....	.....	..	7	6⅞	7⅛	6½	6⅞	6⅝	..	..	6½	6¼	6⅜	6⅜	2,900
Cons. Hercules & Roe.	Colo.	16,500	1,000,000	100,000	10	*	.....	.....	.....	120,000	.....	.....	.....	..	..	..	..	..	..	..	..	..	..	..	..	..	....
Cons. Imperial, G. S.	Nev.	468	50,000,000	500,000	100	475,000	May.	1877	0 20	....	.....	.....	.....	..	..	..	..	..	..	..	1⅛	1	..	..	..	..	400
Con. N. Slope & E. C. T.	Colo.	15,000	500,000	10,000	50	*	.....	.....	.....	.....	.....	.....	.....	..	..	..	..	..	..	..	..	..	..	..	..	..	....
Cons. Virginia, G. S.	Nev.	710	54,000,000	540,000	100	474,600	June	1873	3 00	30,240,000	July	1877	2 00	24	..	..	..	..	..	..	..	..	..	..	..	..	....
Confidence, G. S.	Nev.	130	2,496,000	24,960	100	243,840	Mar.	1873	1 00	78,000	May.	1865	8 ⅓	..	..	..	..	..	5	..	..	..	..	..	..	..	100
Crown Point, G. S.	Nev.	600	10,000,000	100,000	100	1,473,370	June	1877	1 00	11,588,000	Jan..	1875	2 00	24	..	..	4	..	..	..	..	..	..	..	..	..	100
Douglas	Colo.	21,000	1,000,000	10,000	100	*	.....	.....	.....	.....	.....	.....	.....	..	..	..	..	..	..	..	..	..	..	..	..	..	....
Eureka Cons. G. S. L.	Nev.	..	5,000,000	50,000	100	100,000	May	1876	1 00	1,000,000	Aug.	1875	1 00	..	..	..	36½	..	37	..	35½	..	..	..	36	..	400
Eureka G. Mg. G.	Cal'f	....	2,000,000	20,000	100	.....	.....	.....	.....	2,094,000	May.	1877	2 00	..	..	..	..	..	..	..	..	..	..	..	..	..	....
Exchequer, G. S.	Nev.	400	10,000,000	100,000	100	280,000	Sept.	1876	1 00	....	.....	.....	.....	..	..	..	..	..	..	..	..	..	..	..	..	..	....
Gould and Curry, G. S.	Nev.	621	10,800,000	108,000	100	2,242,000	Apr.	1877	1 00	3,934,800	Oct..	1870	10 00	..	..	..	..	..	..	..	8½	..	..	..	..	..	....
Granville Gold	N. C.	9,000	1,000,000	100,000	10	*	.....	.....	0 50	.....	.....	.....	.....	..	..	..	..	..	..	..	..	..	..	..	..	..	....
Hale & Norcross, G. S.	Nev.	400	11,200,000	112,000	100	2,410,000	Apl	1877	.....	1,598,000	Apr.	1871	1 00	12	..	..	..	..	..	..	..	..	..	..	..	..	....
Henry Tunnel	Nev.	3,000	2,000,000	80,000	25	*	.....	.....	.....	.....	.....	.....	.....	..	..	..	..	..	..	..	..	..	..	..	..	..	....
Hukill, G. S.	Colo.	3,288	1,000,000	100,000	10	*	.....	.....	.....	7..,000	Aug.	1877	0 10	12	3	2⅛	..	..	3⅛	3	..	..	..	..	..	..	800
Indian Queen, S.	Nev.	1,000	3,000,000	60,000	50	....	.....	.....	.....	60,000	Dec..	1875	0 50	..	..	..	..	..	..	..	..	..	..	..	..	..	....
Julia Cons., G. S.	Nev.	3,000	11,000,000	110,000	100	330,000	Apr.	1877	1 00	...	.....	.....	.....	..	..	..	..	..	..	..	..	..	..	..	..	..	....
Justice, G. S.	Nev.	2,100	10,500,000	105,000	100	1,060,000	June	1877	1 50	....	.....	.....	.....	..	..	..	..	..	..	..	..	..	..	..	..	..	....
Kentuck, G. S.	Nev.	95	3,000,000	30,000	100	270,000	Dec..	1874	1 00	1,252,000	Mar.	1870	5 00	..	..	..	..	..	4⅛	4	4⅛	4	4⅛	..	4	..	700
Kossuth, G. S.	Nev.	2,700	5,400,000	108,000	50	405,000	Aug.	1876	0 50	....	.....	.....	.....	..	..	..	..	..	..	..	..	..	..	..	..	..	....
Lacross	Colo.	3,900	1,000,000	100,000	10	*	.....	.....	.....	.....	.....	.....	.....	..	40c	38c	41c	39c	39c	37c	40c	36c	..	..	37c	35c	15,700
Leopard, L. G. S.	Nev.	1,500	5,000,000	50,000	100	100,000	July.	1877	50	162,500	Dec..	1876	0 50	..	..	..	1⅞	1	2	1⅞	2	..	2	..	2	..	1,500
Lucerne Mining	Colo	4,200	5,000,000	500,000	10	*	.....	.....	.....	.....	.....	.....	.....	..	..	..	..	..	..	..	..	..	..	..	..	..	....
Mariposa, preferred	Cal.	44.387	5,000,000	50,000	100	1,425,000	June	1877	1 00	.....	.....	.....	.....	..	..	..	..	..	..	..	..	..	..	..	..	..	....
" common	"	acres.	10,000,000	100,000	100	1,425,000	June	1877	1 00	.....	.....	.....	.....	..	..	..	..	..	..	..	..	..	..	..	..	..	....
Memphis	Colo.	6,000	500,000	60,000	8⅓	*	.....	.....	.....	.....	.....	.....	.....	..	..	..	..	..	..	..	..	..	..	..	..	..	....
Merrimac, S.	Mass.	1,500	500,000	50,000	10	*	.....	.....	.....	65,000	June	1877	40c	12	..	..	..	..	6¼	..	6¼	..	..	..	..	..	200
Mexican, G. S.	Nev.	600	10,080,000	100,800	100	151.200	June	1877	0 40	...	.....	.....	.....	..	..	..	..	..	10	..	10⅜	10	10⅛	10	10¼	10	1,100
Moose	Colo.	39,000	2,000,000	200,000	10	....	.....	.....	.....	.....	.....	.....	.....	..	4⅝	4⅜	4⅜	4¼	4⅜	4¼	4¼	4⅛	4⅜	4¼	4½	4⅞	14,820
N. Y. & Colo., G.	Colo.		1,000,000	50 000	20	*	.....	.....	.....	20.000	Mar.	1877	0 20	..	..	..	2	..	..	..	..	..	..	..	..	..	100
Northern Belle, S.	Nev.	1,600	5,000,000	50,000	100	....	.....	.....	.....	1,300,000	July	1877	1 00	..	..	..	..	..	..	..	..	..	..	..	..	..	....
Ontario	Utah	3,000	10,000,000	100,000	100	.....	.....	.....	.....	340.000	July	1877	50	6	2⅛	..	2⅛	2⅛	2⅛	..	2⅛	2⅛	2⅛	..	2⅛	..	2,640
Ophir, G. S.	Nev.	675	10,080,000	100,800	100	2,934,400	May.	1875	2 00	1,394,400	Mar.	1874	4 00	..	..	..	..	..	..	..	..	..	15¼	..	..	..	100
Original Comstock, G. S.	Nev.	....	10,000,000	10,000	100	.....	.....	.....	.....	.....	.....	.....	.....	..	..	..	..	..	..	..	..	..	..	..	..	..	....
Overman, G. S.	Nev.	1,200	3,840,000	38,400	100	2,452,680	June	1877	3 00	....	.....	.....	.....	..	..	..	..	..	..	..	..	..	..	..	..	..	....
Pleasant View, G.	Colo	1,200	200,000	20,000	10	*	.....	.....	.....	.....	.....	.....	.....	..	..	..	..	..	..	..	..	..	..	..	..	..	....
Quicksil. preferred	Cal.	8,500	4,291,300			*	.....	.....	.....	.....	.....	.....	.....	..	26	25	..	..	26¾	..	..	..	27	..	28¼	27	2,100
" common	"	acres.	5,708,700	100,000	100	....	.....	.....	.....	.....	.....	.....	.....	..	..	..	14	..	14	13¾	..	..	15	..	17¼	15½	1,350
Raymond and Ely, G. S.	Nev.	5,000	3,000,000	30,000	100	540,000	Dec.	1876	1 00	3,075,000	Sept.	1873	3 00	..	10½	9½	11½	10½	..	..	..	..	14	..	15½	..	1,065
St. Joseph, L.	Mo.	2600 acs.	1,000,000	100,000	10	....	.....	.....	.....	250,000	.....	.....	.....	..	..	..	..	..	..	..	..	..	..	..	..	..	....
Santiago, G. S.	Nev.	2,000	11,200,000	112,000	100	....	.....	.....	.....	.....	.....	.....	.....	..	..	..	..	..	..	..	..	..	..	..	..	..	....
Savage, G. S.	Nev.	800	11,200,000	112,000	100	3,104,500	May.	1877	1 00	4,460,000	June	1869	3 00	..	..	..	..	..	..	..	..	..	..	..	..	..	....
Seaton, G. S.	Colo.	1,700	500,000	50,000	10	*	.....	.....	.....	10,000	May.	1877	0 10	12	..	..	1	..	..	..	⅞	..	..	..	..	..	400
Seg. Belcher, G. S.	Nev.	160	640,000	6,400	100	244,800	Apr.	1876	5 00	....	.....	.....	.....	..	..	..	..	..	..	..	..	..	..	..	..	..	....
Sierra Nevada G. S.	Nev.	3,650	10,000,000	100,000	100	1,700,000	June	1877	0 50	....	Jan..	1871	1 00	..	..	..	..	..	..	..	..	..	..	..	..	..	....
Silver City, G. S.	Nev.	3,900	6,310,000	63,100	100	15,775	Nev.	1876	0 25	....	.....	.....	.....	..	..	..	..	..	..	..	..	..	..	..	..	..	....
Silver Hill, G. S.	Nev.	5,400	5,400,000	54,000	100	972,000	July.	1877	1 00	....	.....	.....	.....	..	..	..	..	..	..	..	..	..	..	..	..	..	....
South Comstock, G. S.	Nev.	1,500	10,000,000	100,000	100	54,000	Jan	1877	0 25	....	.....	.....	.....	..	..	..	..	..	..	..	..	..	..	..	..	..	....
South. California, G. S.	Nev.	1,500	5,000,000	50,000	100	....	.....	.....	.....	....	.....	.....	.....	..	..	..	..	..	..	..	..	..	..	..	..	..	....
Southern Star, G. S.	Nev.	1,500	6,000,000	600,000	100	....	.....	.....	.....	....	.....	.....	.....	..	..	..	..	..	..	..	..	..	..	..	..	..	....
Trenton, G. S.	Nev.	..	10,000,000	100,000	100	....	.....	.....	.....	....	.....	.....	.....	..	..	..	..	..	..	..	..	..	..	..	..	..	....
Union Cons., G. S.	Nev.	850	10,000,000	100,000	100	260,000	Mar.	1876	1 00	....	.....	.....	.....	..	..	..	..	..	..	..	..	..	..	..	..	..	....
West Belcher, G. S.	Nev.	1,000	10,000,000	100,000	100	....	.....	.....	.....	....	.....	.....	.....	..	..	..	..	..	..	..	..	..	..	..	..	..	....
Yellow Jacket, G. S.	Nev.	1,200	12,000,000	120,000	100	2,958,000	July	1877	1 00	2,184,000	Aug.	1871	2 50	..	..	..	..	..	..	..	..	..	..	..	..	..	....
Young America, S.	Nev.	1,000	3,000,000	30,000	100	6,000	Oct..	1876	0 20	...	.....	.....	.....	..	..	..	..	..	..	..	..	..	..	..	..	..	....
Copper Stocks.																											
Allouez, C.	Mich.	..	1,000,000	20,000	50	940,000	May.	1876	5 00	....	.....	.....	.....	..	....	....	....	....	....	....	....	....	....	....	....	....	....
Calumet & Hecla, C.	Mich.	..	2,000,000	80,000	25	1,200,000	.....	.....	.....	11,450,000	Feb.	1877	5 00	20	....	....	....	....	....	....	....	....	....	....	....	....	....
Central, C.	Mich.	..	500,000	20,000	25	100,000	June	1862	0 65	1,160,000	Feb.	1877	7 00	28	....	....	....	....	....	....	....	....	....	....	....	....	....
Copper Falls, C.	Mich.	..	1,000,000	20,000	50	535,000	May.	1876	.....	100,000	Nov.	1871	1 00	..	....	....	....	....	....	....	....	....	....	....	....	....	....
Dana, C.	Mich.	..	500,000	20,000	25	68,000	Jan..	1863	0 50	...	.....	.....	.....	..	....	....	....	....	....	....	....	....	....	....	....	....	....
Dawson, S.	Ont.	..	1,200,000	60,000	20	....	.....	.....	.....	....	.....	.....	.....	..	....	....	....	....	....	....	....	....	....	....	....	....	....
Duncan, S.	Ont.	..	1,200,000	60,000	20	75,000	July.	1876	4⅓	....	.....	.....	.....	..	....	....	....	....	....	....	....	....	....	....	....	....	....
Franklin, C.	Mich.	..	500,000	20,000	25	360,000	June	1876	5 00	585,000	Nov.	1871	1 00	..	....	....	....	....	....	....	....	....	....	....	....	....	....
Humboldt, C.	Mich.	..	500,000	20,000	25	100,000	Sept.	1876	0 15	....	.....	.....	.....	..	....	....	....	....	....	....	....	....	....	....	....	....	....
International, S.	Ont.	..	1,200,000	60,000	20	....	.....	.....	.....	....	.....	.....	.....	..	....	....	....	....	....	....	....	....	....	....	....	....	....
Madison, C.	Mich.	..	500,000	20,000	25	123,000	Sept.	1876	0 10	....	.....	.....	.....	..	....	....	....	....	....	....	....	....	....	....	....	....	....
Mesnard, C.	Mich.	..	500,000	20,000	25	160,000	Apr.	1876	0 50	....	.....	.....	.....	..	....	....	....	....	....	....	....	....	....	....	....	....	....
Minesota, C.	Mich.	..	1,000,000	20,000	50	436,000	June	1869	1 00	1,820,000	Mar.	1876	0 50	..	....	....	....	....	....	....	....	....	....	....	....	....	....
National, C.	Mich.	..	500,000	20,000	25	195,000	Oct..	1875	1 00	360,000	Oct..	1873	1 00	..	....	....	....	....	....	....	....	....	....	....	....	....	....
Osceola, C.	Mich.	..	1,000,000	40,000	25	880,000	May.	1876	2 00	....	.....	.....	.....	..	....	....	....	....	....	....	....	....	....	....	....	....	....
Petherick, C.	Mich.	..	500,000	20,000	25	165,533	Mar.	1876	0 50	...	.....	.....	.....	..	....	....	....	....	....	....	....	....	....	....	....	....	....
Pewabic, C.	Mich.	..	500,000	20,000	25	185,000	June	1868	3 00	460,000	July	1873	1 00	..	....	....	....	....	....	....	....	....	....	....	....	....	....
Phœnix, C.	Mich.	..	1,000,000	20,000	50	817,500	Sept.	1870	3 00	20,000	Jan.	1876	1 00	..	....	....	....	....	....	....	....	....	....	....	....	....	....
Quincy, C.	Mich.	..	200,000	20,000	10	....	.....	.....	.....	2,130,000	Feb.	1877	4 00	..	....	....	....	....	....	....	....	....	....	....	....	....	....
Ridge, C.	Mich.	..	500,000	20,000	25	200,000	.....	.....	.....	90,000	Feb.	1875	1 00	..	....	....	....	....	....	....	....	....	....	....	....	....	....
Rockland, C.	Mich.	..	500,000	20,000	25	495,000	Jan..	1874	1 00	....	.....	.....	.....	..	....	....	....	....	....	....	....	....	....	....	....	....	....
Star, C.	Mich.	..	500,000	20,000	25	265,000	Mar.	1876	0 50	....	.....	.....	.....	..	....	....	....	....	....	....	....	....	....	....	....	....	....
Superior, C.	Mich.	..	500,000	20,000	25	340,000	Mar.	1874	0 25	....	.....	.....	.....	..	....	....	....	....	....	....	....	....	....	....	....	....	....

G. Gold. S. Silver. L. Lead. C. Copper. * Non-Assessable.

Total Assessments levied to date ..... $45,242,590 | Total Sales of Coal Stocks for the week ..... 104,663 share
Total Mining Dividends disbursed to date ..... 118,177,900 | Total Sales of Mining Shares for the week ..... 60,675 "

Copper Stocks.

Reported by Wilson W. Fay & Co., Bankers and Brokers Room 7, Traveler Building, 31 State Street.

BOSTON, THURSDAY EVENING, Aug. 9, 1877.

The market remains dull, yet the stocks in which there have been transactions look strong, especially Calumet and Hecla, which has advanced from 166 to 170 bid and 172 asked (ex dividend). Central has advanced to 40 bid and little stock offering at any price; the bid will probably have to reach a much higher figure in order to bring out any stock, as the holders have faith in it and offer none for sale. Copper Falls is steady, 3.25 bid and 3.50 asked and more buyers than sellers. Franklin is dull at 5.00 bid and 5.50 asked. National holds steady at 40c. bid and 50c. asked, and is thought to be a good purchase. Osceola is quiet with few buyers at 19.00 and sellers at 20.00; the sellers being in the majority. In Pewabic there has been no change and the stock remains 1.50 bid and 1.75 asked. Quincy does not fluctuate much, although there have been a good many sales it holds steady at 33.00 to 33.25. Duncan Silver has fallen steadily all week from 2⅝ to 2⅜, there being sales at 2⅝@2⅜@2⅛ and 2⅜, the best bid at present being 2⅛. International has advanced somewhat, there being sales at 32½c., and closing at 30c. bid and 33c. asked. Most of the small coppers are unusually quiet but are down so low that sooner or later there ought to be a demand for them.

Gold and Silver Stocks.

NEW YORK, Friday Evening, Aug. 10, 1877.

The dealings in mining shares for the week under review differ but little in the total number of shares from those of the previous week. As for several weeks past the Moose Mine has been the leading attraction, the sales aggregating 14,820 shares at 4⅛ to 4⅝, Lacrosse followed, with sales of 15,700 shares at 36c. to 41c., these two stocks covering more than half the business of the whole market. It is not to be supposed that more than a very small proportion of these sales were *bona fide*. Quicksilver Mining Company has shown some activity and a considerable advance in prices, caused by an advance in San Francisco, in a week's time, of about 60 per cent. in the price of Quicksilver. The sales of preferred stock aggregated 2,100 shares, at from 25 to 28¼, closing at 28, and of common stock, 1,350 shares at 13¾ to 17¼, closing at 16¾. There were dealings in Ontario amounting to 2,040 shares at 21½ to 21¾. Cleveland was dealt in to the extent of 2,900 shares at 7 to 6¼. On Wednesday, the Bertha and Edith (two companies consolidated) Gold Mining Company was admitted to the list of the Mining Board, and yesterday sales began, aggregating since then 6,500 shares at 1¼ to 1⅝. This company has issued a prospectus cotaining reports that are looked upon unfavorably by mining experts. The Comstock stocks are receiving but little attention upon the whole. The business is far from a healthy one, although better results are looked for later on. Coll. J. Turner was elected vice-president of the Mining Board yesterday.

Ontario Silver Mining Company.—We notice in our advertising column that the Ontario Silver Mining Company will pay its eighth regular monthly dividend of 50c. gold per share, at the office of the transfer agents, Wells, Fargo & Co., on the 15th inst.

At our request, the company has furnished us with the following report:

OFFICE OF THE ONTARIO SILVER MINING CO.,
31 Broad St., New York, August 9, 1877.

Balance July 1, 1877		$256,494.76
July product		150,000.00
		$406,494.76
Disbursements.		
Dividends 5, 6, and 7	$150,000	
Expenses mill and mine, and discount on bullion for July, estimated at	50,000	200,000.00
Gold balance August 1, 1877		$206,494.76

R. P. LOUNSBERY, V. P.

According to the *Gold Hill News* of August 1, the Consolidated Virginia and California mines were both looking very well and continuing a full output of ore, assuring the payment of the usual dividends of $2 per share. The financial difficulties of the Lady Byron have been overcome, and the mine will soon be started, with new pumping and hoisting machinery. The header of the Sutro Tunnel is advancing in softer material than heretofore The total length of the tunnel on the 1st inst. was 17,611 feet.

Gas Stocks.

NEW YORK, FRIDAY EVENING, August 10, 1877.

The market is dull, with New York stocks a little firmer.

The following list of Companies in New York and vicinity are corrected weekly by GEORGE H. PRENTISS, Broker and Dealer in Gas stocks, No. 30 Broad street, N. Y.

Companies in New York and vicinity.	Capital Stock.	Par.	Dividends. Rate per an.	Am. of last.	Date of last.	Quotat'ns Bid.	As'd
	$						
Mutual, N. Y.	5,000,000	$100	10%	2½	July '77	92½	96
" Gold Bonds	90,000	1,000	7%	3½	Feb. '77		107
N. York "	4,000,000	....	10%	5	May '77	125	130
Metrop. "	2,500,000	100	10%	5	June '77	133	137
" " Certf.	1,000,000	....	7%	3½	" "	100	103
" " Bonds	500,000	1,000	7%	3½	" "	102	—
Harlem "	1,850,000	50	8%	3½	Aug '77	95	100
Manhat. "	4,000,000	50	....‡	5	July '77	300	210
Brooklyn, B'klyn.	2,000,000	52	15%	5	July '77	150	160
Nassau, "	1,000,000	25	....‡	4	July '77	—	80
" " Certf.	700,000	1,000	7%	3½	July 77	95	100
People's, "	1,000,000	10	.-..‡	3½	July '76	40	45
" " Certf.	300,000	1,000	7%	3½	July '77	80	85
" B'ds	325,000	....	7%	3	Feb. '77	90	96
Metrop. "	1,000,000	10	5%	2½	May '77	65	70
Wmsb'rg "	1,000,000	50	10%	2½	Apr. '77	115	122½
" " Certf.	1,000,000	...	7%	3½	July '77	100	102
Citizen's "	1,200,000	20	....‡	4	Jan. '77	75	80
" " Certf.	320,000	1,000	7%	3½	Apr. '77	97	100
J. C., N. J.	750,000	20	10%	5	July '77	160	—
Cent. Westch. N.Y	466,000	50	7%	4	July '77	85	90
Subur'n " "	295,000	50	7%	3½	Apr. '77	90	100
Municipal, N.Y.	1,500,000	100	....	....	....	..	90

‡ Paid irregularly.

Cleveland Gas.—The City Council Committee on Gas submitted a report on the 6th inst. recommending that the present time table regulating the lighting of street lamps from August 18 to December 31 be so amended as to conform with a new time table presented. The new table will increase the time of lighting each lamp ninety-two hours during the five months named, and will add about $2,200 to the cost. The report with a resolution to carry out its provisions were both referred to the Committee on Appropriation and City Auditor.

Chicago Gas.—Ald. Thompson submitted on the 6th inst. a communication from the manager of the Globe Gaslight Company, Cincinnati, proposing to light the streets of Chicago, in accordance with the schedule now in use, at the rate of $24 per lamp per annum, payments to be made monthly or quarterly in current funds. Referred to the Committee on Gas.

Hamilton (Ohio) Gas Supply.—The City Council of Hamilton, Ohio, at their meeting on the 23d ult., adopted plans and specifications to govern proposals for furnishing that city with gas, both for public and private consumption. The contract is to commence June 3d, 1878, and to be for a period of ten years, the bond required from the party or parties, to whom the contract may be warded being in the sum of $25,000, bondsmen to be residents of the State of Ohio. In case the contractor erects new works, the city reserves the right to designate the locality where such works are to be erected. We do not learn that any limit has been set to the time up to which proposals will be received.

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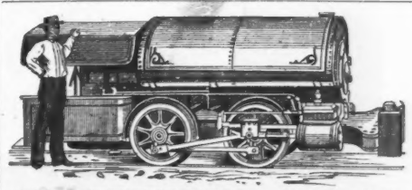

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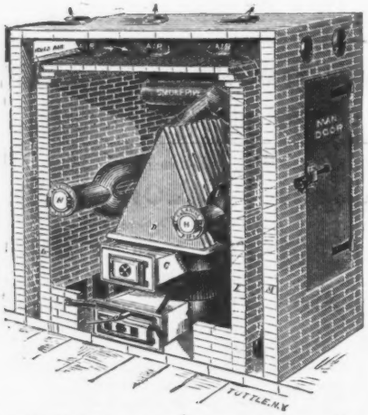

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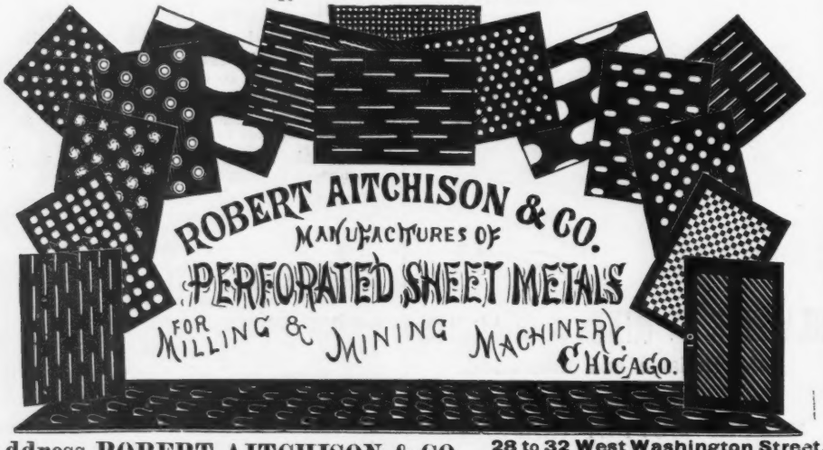

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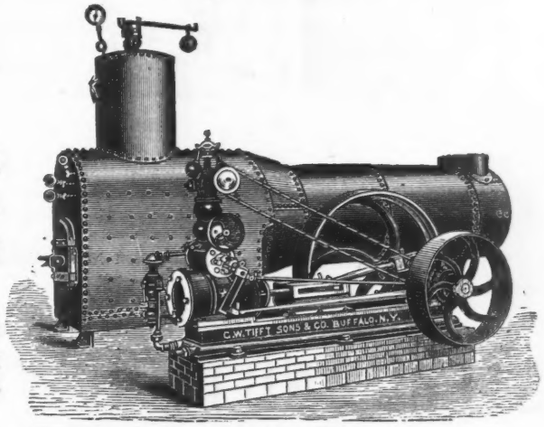

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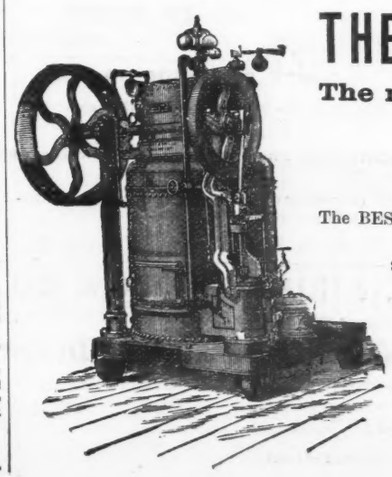

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